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MAIN TRENDS IN SOVIET CAPABILITIES
AND POLICIES, 1961-1966

ANNEX A: SOVIET MILITARY FORCES AND CAPABILITIES

ANNEX B: TABLES OF SINO-SOVIET BLOC MILITARY STRENGTHS AND
CHARACTERISTICS OF SELECTED WEAPONS AND EQUIPMENT

(These Annexes supersede Annexes A and B of NIE 11-4-60
and will be revised and reissued with the full text of NIE
11-4-61 scheduled for completion in December 1961.)

Submitted by the

DIRECTOR OF CENTRAL INTELLIGENCE

The following intelligence organizations participated in the preparation of this estimate: The Central Intelligence Agency and the intelligence organizations of the Departments of State, the Army, the Navy, the Air Force, The Joint Staff, and Atomic Energy Commission.

Concurred in by the

UNITED STATES INTELLIGENCE BOARD

on 24 August 1961. Concurring were The Director of Intelligence and Research, Department of State; the Assistant Chief of Staff for Intelligence, Department of the Army; the Assistant Chief of Naval Operations (Intelligence), Department of the Navy; the Assistant Chief of Staff, Intelligence, USAF; the Director for Intelligence, Joint Staff; the Assistant to the Secretary of Defense, Special Operations; the Director of the National Security Agency, and the Atomic Energy Commission Representative to the USIB. The Assistant Director, Federal Bureau of Investigation, abstained, the subject being outside of his jurisdiction.

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MAIN TRENDS IN SOVIET CAPABILITIES AND POLICIES, 1961-1966

ANNEX A

SOVIET MILITARY FORCES AND CAPABILITIES

INTRODUCTION

1. For the past several years, the general structure of the Soviet armed forces has been undergoing its most important changes since the end of World War II. These changes have resulted primarily from a rapid and continuing adaptation to new military technology, principally in the fields of nuclear weapons and missiles. They also reflect an adjustment to the new strategic situation in which both the US and the USSR can deal vastly destructive nuclear blows at the outset of a war.
2. The Soviets recognize a primary requirement for long range striking forces and defense against the enemy's similar forces. They are presently devoting great efforts to strengthening these forces with new missile capabilities. At the same time, they are retaining and adjusting their other military capabilities so as to maintain forces suitable for all types of warfare, nuclear and conventional, limited and general. Along with the stress on missiles, they are pursuing research and development in other weapons fields.
3. In reacting to the technological revolution in weaponry, the Soviets have come to consider that they no longer need standing armies as massive as those maintained in the World War II tradition. They evidently believe that a part of this manpower can be more effectively put to use in the economy, and that a smaller, modernized standing force, backed up by a strong mobilization capacity, provides a wide range of combat potential. As part of the same process, they are pruning away unnecessary and obsolescent elements

and are developing the command structure and communications appropriate to modernized forces. In all these changes, they are seeking military power suited to the current strategic situation and capable of giving the strongest support to their policy.

4. The Soviets will continue their intensive efforts in weapons research and development with the object of acquiring new systems which, by their psychological, political, and military impact, will shift the world relation of forces to their advantage. In making their decisions, Soviet planners will have to consider such problems as rapid technological change, long lead times, developments in opposing forces, and increasing costs. Despite the rapid growth in Soviet economic resources, there will continue to be competition among military requirements as well as with the demands of important nonmilitary programs. In deciding whether to produce complex new weapon systems in quantity, the USSR will probably apply increasingly severe tests as to whether these would add greatly to current capabilities, and as to whether costs are justified by likely periods of use before obsolescence.

CHANGES IN THE SIZE AND COMPOSITION OF THE SOVIET ARMED FORCES

5. In a major military policy statement on 14 January 1960, Khrushchev described in broad outline a program for a large reduction in manpower and alterations in the structure of the Soviet armed forces. The motivations for the proposed program were mixed and reflected political and economic as well as mili-

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tary considerations. Politically, Khrushchev wished to bolster the Soviet pose of peacefulness and to claim the initiative in the universally applauded cause of disarmament. On the military-strategic side, the chief considerations were the Soviet confidence in their attainments in guided missiles and nuclear weapons and their belief that developments in these and other fields would permit establishment of a smaller, but more effective, military force without sacrifice of military potential.

6. The creation of a new rocket command in 1960 reflected the rising importance of missile systems. Khrushchev declared in his January 1960 military policy address that rocket forces are now a main component of the armed forces, while "the air forces and the navy have lost their previous importance." However, authoritative Soviet military statements make it clear that in the Soviet view balanced and varied military forces remain necessary. The trends in weapons development and military production over the last few years, the nature of the reductions in 1960-1961, and the indications of the weapons systems being replaced to some extent by missiles provide guidance in estimating the general pattern of the future Soviet force structure.

7. The program announced in January 1960 projected a cut of 1.2 million men in the Soviet armed forces, which we estimate then numbered about 3,625,000 men. This reduction was scheduled to be completed by the end of 1961. There have been indications from a variety of sources that substantial reductions were in fact effected, particularly in the middle six months of 1960. Soviet political and military leaders from time to time reaffirmed this program until Khrushchev announced its suspension in July 1961. Although there was considerable slippage in the program well before its announced suspension, there is evidence of some demobilization and unit deactivations as late as the spring of 1961.

8. We estimate that the personnel strength of the Soviet armed forces totaled approximately 3 million men as of mid-1961, not counting militarized security forces number-

ing over 200,000.¹ This reflects the completion of about one-half of the originally announced reduction, including the major part of the air forces' cut. Reductions remaining to be made when the program was suspended involved about half a million men, primarily in the ground forces. The immediate effects of the suspension, therefore, will be to stabilize personnel strength at about 3 million, to hold ground forces at about 150 line divisions, and in some cases to slow down the retirement of older ground, air, and naval equipment.

9. In estimating future developments, we are confronted by two conflicting elements in the situation. On the one hand, we believe that those basic demographic, economic, political, and military considerations which led the Soviet leaders to decide on a major reduction by and large remain. On the other hand, Soviet initiatives—and Western reactions—in the course of the Berlin crisis, and prevailing tensions throughout the world, involving demonstrative military preparations on both sides, have evidently ruled out further reductions at this time. We believe that the size of the Soviet armed forces will for some time to come remain at roughly present levels, but the Soviet leaders will probably revert to a reduction in military manpower later if international tensions ease.

SOVIET MILITARY EXPENDITURES

10. The estimated dollar value of total Soviet military expenditures is now roughly 37 billion 1959 US dollars per annum; it is expected to increase somewhat during the period to 1966 even though there may be personnel reductions. These expenditures include those for personnel, maintenance, research and development, procurement, construction, and other military activities required to support the military forces estimated in this Annex.

11. Estimated Soviet military expenditures by major mission provide an indication of significant distribution and shifts in emphasis within the military establishment. From the available data, we are able to apportion about

¹See Table 1 in Annex B for estimated personnel strengths of the various elements of the Soviet armed forces on 1 July 1961.

two-thirds of the total spending among the following major missions: land campaigns, air defense, long range attack, and naval missions. The major part of the residual expenditures is for research and development, which is certain to have very high priority in the next five years.

12. The proportion of total Soviet military expenditures devoted to forces for land campaigns, including tactical aviation, is estimated to decline from about one-third of total spending in 1960-1961 to about one-fifth in 1965-1966. Estimated air defense expenditures rise from nearly 15 percent at present to nearly 20 percent by the end of the period, with the bulk of the increase coming in the later years assuming antimissile defenses are established. Expenditures for long range attack forces, including missile-launching submarines, are also estimated to rise from somewhat over 10 to about 15 percent, particularly through the early 1960's as new missile forces are installed. Expenditures for the naval mission rise slightly in the early 1960's but stand at about 10 percent through 1966.

13. On 8 July 1961, Khrushchev announced a 3.1 billion ruble, or one-third, increase in the previously announced defense budget for 1961. We believe that in the main this increase was motivated by political considerations related to the Berlin crisis. For one thing, the figure is equivalent, at the official exchange rate, to the increase in US defense spending announced in January 1961, which Khrushchev cited in the same speech; for another, while Soviet budgeting is normally on a year-by-year cash basis, it is very doubtful that this amount could actually be expended this year. About one-sixth of this total (i.e., about 0.5 billion rubles) represents the amount needed to pay servicemen kept on active duty rather than demobilized as planned. The remaining 2.6 billion rubles may in part represent funds expended for military purposes but normally concealed in other portions of the budget. Thus Khrushchev's announcement may not signal any substantial change in Soviet military programming beyond the suspension of force reductions.

14. However, it probably represents in part a real increase in military expenditure. It could be used for retention of older air and naval weapon systems longer than planned. It could be used to initiate a more rapid or extensive buildup in offensive and defensive missile systems than previously planned. Some near-term outlays could be undertaken including increasing the immediate readiness of existing Soviet forces (e.g., intensification of training activities and maneuvers, establishment of alert capabilities in bomber forces), but there is as yet no evidence on whether or not the USSR plans such measures for the remainder of this year.

FORCES FOR LONG RANGE ATTACK

15. On 7 June 1961, the United States Intelligence Board approved NIE 11-8-61, "Soviet Capabilities for Long Range Attack" (TOP SECRET). In the following paragraphs, we summarize and update the portions of NIE 11-8-61 which deal with Soviet heavy and medium bombers, related air-to-surface missiles, and submarine-launched missiles. Discussion of Soviet ICBM, IRBM, and medium range ballistic missile programs is omitted from this Annex. The updating of these portions of NIE 11-8-61 is reserved pending completion of a detailed analysis, now in process, of (a) the intensive Soviet ICBM test firing activity in the first half of 1961, and (b) new information on Soviet ballistic missile deployment.

Long Range Aviation

16. The Aviation Day display at Moscow on 9 July 1961, together with other recently acquired information, has provided more precise definition of specific developments in the field of long range bombers and related air-to-surface missiles, along the general lines sketched in our previous estimates. The new evidence does not alter the conclusion that within the Soviet long-range striking forces, ballistic missiles are clearly intended to become the dominant weapons, but that five years hence the USSR will still supplement its missile forces with manned bombers for both weapon delivery and reconnaissance. As of mid-1961,

the main weight of a large-scale nuclear attack against distant targets would probably still be carried by the bombers of Long Range Aviation.

Heavy Bombers

17. Reliable evidence now indicates that Soviet operational units were equipped with approximately 150 heavy bombers in mid-1961, including about 100 jet-powered BISONs and BISON tankers and about 50 turboprop BEARs. Because of the age of the BISON design, limitations in its range and altitude capabilities, the very low recent rate of BISON production, and evidence of helicopter production as well as development work on the BOUNDER at the BISON plant, we believe that the program to build new BISONs will terminate in the relatively near future. The BEAR is no longer in production, but the evidence indicates that an extensive factory re-fit program has been underway to modify BEARs for air-to-surface missile delivery.

18. The AS-3 air-to-surface missile displayed on BEAR at Aviation Day will extend the useful service life of this aircraft by permitting it to attack targets from beyond the range of close-in defenses. The AS-3 is a supersonic missile with a maximum range of about 350 n.m. It probably employs inertial guidance to deliver a high-yield nuclear warhead against land targets with a CEP of 1-2 n.m. Of existing Soviet bomber types, only the BEAR is believed to have been modified to carry the AS-3. The modified BEAR can carry one such missile with a reduction of some 8 to 10 percent in aircraft radius; it is probably not designed to carry a bombload in addition to the missile. Virtually all BEARs will probably be modified within the next year or two, and an operational inventory of about 100 AS-3 missiles is likely to be built up in that period.

19. Research and development in new heavy bombers continues, but it apparently does not enjoy a high priority. The BOUNDER displayed at the air show was clearly a prototype with an experimental installation of engines. At least one other similar prototype is in a state of partial assembly at the BISON plant.

This aircraft type, first observed at the BISON plant in Moscow in 1958, is unsatisfactory for operational use in the form displayed. Its configuration appears designed for intercontinental missions and a maximum "dash" speed in excess of Mach 2. However, with present power plants its maximum "dash" speed is probably less than Mach 1.5 and its operating radius would be inferior to that of the BADGER medium bomber. While some improvements can be made through installation of better jet engines, we believe it extremely unlikely that the BOUNDER could achieve a refueled intercontinental capability with supersonic "dash."

20. There have been fragmentary indications of a Soviet program to develop an ANP system over the past five years. If active and successful development is pursued, such a program could produce an aircraft nuclear power plant as early as 1963-1964. This might permit a first militarily useful nuclear-powered aircraft to become available in 1966. However, the lack of evidence of the program, the decreasing frequency of Soviet statements on progress, and the apparent general level of their reactor technology indicate that the effort may have encountered serious obstacles. Therefore, we believe it unlikely that the Soviets will obtain a militarily useful nuclear-powered aircraft during the period of this estimate. However, considering the propaganda impact, the Soviets might at any time fly an aircraft obtaining part of its thrust from nuclear heat.

21. We continue to believe that the Soviets may see a requirement for advanced aircraft of intercontinental range, to be used for weapon delivery and reconnaissance missions in conjunction with ballistic missile attacks. We therefore regard it as possible that a new type of heavy bomber will enter service during the period of this estimate.

Medium Bombers

22. The bulk of Long Range Aviation still consists of BADGER bombers and tankers, about 975 of which are now in operational units. BADGER production ceased in 1959, but the capabilities of some of these aircraft have been

improved somewhat through subsequent factory modifications, including the installation of better engines and electronic equipment. The international situation and the suspension of force reductions makes it unlikely that there will be sharp cuts in medium bomber strength in the near term, as previously estimated. We now believe that the force will decline fairly gradually, with the new medium bomber (BLINDER) in part offsetting the retirement of BADGERs, and with additional conversions of units to more specialized functions. The role of reconnaissance and other special purposes will become increasingly important.

23. The supersonic BLINDER, 10 of which were displayed on Aviation Day, is probably now in service in very limited numbers. Aerial photography indicated that production was under way at Kazan more than a year ago; an estimated 50 have been produced to date. We continue to estimate the BLINDER's maximum speed at Mach 1.5 to 2, and its unrefueled radius (including 200 n.m. supersonic "dash") at 1,650 n.m. with a 10,000 lb. bombload. The air show revealed that this aircraft is of sophisticated design, and its characteristics should make it an excellent weapon system for specialized missions including coordination with large-scale ballistic missile attacks. We therefore estimate that the BLINDER will continue to be produced through the next five years. A total of about 300 in Long Range Aviation units in mid-1966 would be well within Soviet production capabilities and would seem a reasonable number for operational purposes.

24. The air show revealed Soviet work on improved refueling techniques and new air-to-surface missiles for medium bombers. A

BADGER and a BLINDER displayed probes suitable for a new type of refueling system, which should be superior to the wingtip-to-wingtip refueling hitherto employed by BADGERs. We have no evidence of BLINDER tankers; BADGER or BISON tankers could probably perform this function. One BLINDER carried what appears to be a new supersonic cruise-type air-to-surface missile. One of the BADGERs may also have been fitted for such a missile. On the basis of preliminary analysis, we believe that this ASM is of a boost-glide configuration, capable of delivering a 1,000 lb. payload to a range of 300-600 n.m. at a terminal speed of Mach 2.3.

Trends and Capabilities

25. We continue to believe that Long Range Aviation will decline in numerical strength as the Soviets place increasing reliance on missiles, but we believe that over the next few years this reduction will be somewhat more gradual than previously estimated. It is likely that in 1966 the USSR will still retain a substantial long range bomber force. In the interim, it will continue to improve its proficiency and its equipment. The new trends of most importance now appear to be the conversion of BEARs to a missile-launching mission and the probable introduction of BLINDERs into the medium bomber force. Refueling techniques for medium bombers will probably be improved, and it is probable that new air-to-surface missiles will become operational. There is also a possibility that small numbers of new heavy bombers will be in units at the end of the period, but in mid-1966 Soviet Long Range Aviation will probably consist almost exclusively of presently-known aircraft types, as shown in the table below:

	MID-1961	MID-1962	MID-1963	MID-1964	MID-1965	MID-1966
<i>Heavy Bombers</i> ^c						
BISON ^a	100	100	100	95	90	80
BEAR ^b	50	50	45	45	40	40
Total	150	150	145	140	130	120
<i>Medium Bombers</i>						
BADGER ^a	975	875	750	675	575	450
BLINDER ^d	a few	50	100	150	225	300
Total	975-1,000	925	850	825	800	750

Footnotes on following page.

Footnotes for tabulation on previous page.

* BISON and BADGER figures include aircraft fitted as tankers. These are available in all BISON units and in about half the BADGER units. They can probably be reconverted to bombing use in a few hours.

* Within the next year or so, virtually all BEARs will probably have been modified to carry and launch 350 n.m. air-to-surface missiles rather than bombs.

* It is possible that a few heavy bombers of a new type will be in operational units by 1966.

* Will possibly be equipped with a new air-to-surface missile. We have no present evidence of a BLINDER tanker; BADGER and BISON tankers could probably perform this function.

26. The employment of the Soviet long range bomber force in the event of general war would depend upon a variety of factors, including the circumstances under which hostilities commenced. At the present time, initial Soviet attacks would rely heavily on bomber operations, with aircraft and missile launchings timed so as to minimize advance warning of the Soviet attack. Taking into account training patterns and a variety of operational factors (including Arctic staging and refueling as necessary, but excluding combat attrition), we estimate that at present the USSR could put about 200 bombers over North America on two-way missions in an initial attack, more than half of which would be medium bombers. The Soviets have a considerably larger gross capability for attacking the US itself, but to exercise it they would have to employ medium bombers on one-way missions and to use crews who had not had Arctic training. With the advent of Soviet missile capabilities, we regard this use of the medium bomber force as increasingly unlikely.

Medium Bombers of Other Components

27. More than 400 BADGERs are assigned to components other than Long Range Aviation. Of these, about 350 are assigned to Naval Aviation and about 75 to Tactical Aviation. It is possible that BLINDERs will be introduced into these forces in the next few years. Naval BADGER units are specially trained and equipped to attack such targets as carrier task forces at sea, while tactical units are intended primarily to support ground force operations. These units, in addition to the Long Range Aviation BADGERs not assigned to operations against North America, would presumably be

employed in attacks on Eurasian and peripheral targets.

Missile Launching Submarines

28. Soviet planners almost certainly would wish to assign land targets to missile-launching submarines in any contemplated attack on the US. The principal current Soviet capability rests in conventionally-powered long range submarines of the "G" and "Z-Conversion" classes, which are probably equipped to launch short range ballistic missiles, though not while submerged. Recent evidence leads us to believe that the Soviets probably also have nuclear-powered submarines equipped with similar missiles.

29. Some 21 "Z-Conversion" and "G" class missile submarines are now in operational units. Considering the size and configuration of these submarines and evidence from the Soviet missile development program, we believe they carry liquid fueled ballistic missiles of 150 or 350 n.m. maximum range. The missiles are apparently carried vertically in tubes which extend from the keel up into the large and unusual sails of these submarines. The "Z-Conversion" class has two such tubes; the "G" class probably has three. We believe that supersonic cruise-type missiles with about 300 n.m. range are also being developed for use by surfaced submarines. A submarine for this system has not yet been identified, but we believe such a system could be operational this year.

30. Several units of a new Soviet submarine class, designated the "H" class, have recently been observed. We believe that this is the

first of several classes of nuclear-powered submarines currently estimated to be under construction. Certain key features of the sail of the "H" class are similar to the sail of the "G" class. Therefore, while we cannot yet be certain, it is our present belief that the "H" class is also equipped with three 150 or 350 n.m. ballistic missiles. Thus the Soviets apparently designed their first nuclear-powered submarine class to be equipped with surface-launched, short range missiles. The "H" class presumably formed the basis for the recent Soviet claim of numerical superiority over the US in nuclear-powered missile submarines.

31. Of the foregoing three types of submarines, we estimate that 21 (including 7 "H" class) are assigned to the Northern Fleet and 7 "G" and "Z-Conversion" class submarines are in the Pacific Fleet. An additional submarine thought to be a nuclear-powered missile-launching type may now be fitting out in the Pacific. Operating directly from home bases, the range of these submarines would permit operations within missile range of US targets, but we believe that only a few have engaged in extended out-of-area training. We anticipate only a moderate increase in both "G" and "H" class strength over the next year or two.

32. We continue to believe that the Soviets have a requirement for a system capable of delivering ballistic missiles against land targets from a submerged nuclear-powered sub-

marine. However, the probability that the "H" class is missile-equipped, together with the absence of evidence of developmental work on a missile suited to submerged launching, lead us to believe that Soviet planners have regarded an early missile-launching capability with a nuclear-powered submarine as more urgent than the acquisition of a more advanced system. We believe that the Soviets will seek to improve the range and flexibility of their submarine-launched missile systems. In addition to possible improvements in present systems, we believe that an advanced system could become operational in 1963, with a 500-1,000 n.m. submerged-launched missile. About six such missiles per submarine would not be inconsistent with what is now known of Soviet missile and submarine design practices and capabilities.

33. Taking into account estimated Soviet capacities to construct nuclear-powered submarines, and with allowance for estimated construction of torpedo attack nuclear submarines, we estimate that a gradual buildup of missile-launching ships will occur over the next five years. By 1966, the USSR will probably have about two dozen nuclear-powered missile submarines, roughly half of them "H" class and half of more advanced design, and will retain an equal number of conventionally-powered missile submarines of the "Z-Conversion" and "G" classes. Our revised estimate of Soviet operational strength in missile-launching submarines is as follows:

	MID- 1961	MID- 1962	MID- 1963	MID- 1964	MID- 1965	MID- 1966
<i>Conventionally-powered Submarines</i>						
"Z-Conversion" class	6	6	6	6	6	6
150 or 350 n.m. missiles (two per submarine)	12	12	12	12	12	12
"G" class	15	18	18	18	18	18
150 or 350 n.m. missiles (three per submarine)	45	54	54	54	54	54
<i>Nuclear-powered Submarines</i>						
"H" class	7	10	12	12	12	12
150 or 350 n.m. missiles (three per submarine)	21	30	36	36	36	36
Advanced class	—	—	1	4	8	12
500-1,000 n.m. missiles (about six per submarine)	—	—	6	24	48	72

AIR DEFENSE FORCES²

34. The scale of effort presently being applied to the continuing improvement and modernization of the Soviet air defense system is indicative of the high priority assigned to this mission. During the past two to three years, the Soviet air defense establishment has been undergoing a major transition which has resulted in a more effective combination of fighter and missile defenses. The USSR now relies primarily upon missiles for point defense of important targets, and upon fighters for area defense to cover approach routes as well as gaps between missile defended areas. The principal aspects of this transition have been: (a) the extensive deployment of surface-to-air missile sites; (b) the installation of air defense communications and control systems with semiautomatic features; (c) the deployment of new fighters and radars to Eastern Europe and areas near the borders of the USSR; and (d) a consolidation of air defense districts. Other developments include radars with better detection and height-finding capabilities, and the equipment of interceptors with more advanced electronic gear and armament, including air-to-air missiles.

Surface-to-Air Missiles

35. The Soviets now have operational two types of surface-to-air missile systems designed for defense against medium and high altitude air attacks. The first of these (SA-1), which was completed and became fully operational about five years ago, is deployed only around Moscow in a massive complex of 56 sites, each having 60 launching positions. This system, capable of handling a large number of targets and of directing a high rate of fire against them, was apparently designed to counter the massed air raid threat of the late 1940's and early 1950's. Even before completion of the deployment around Moscow, it is probable that concepts of the threat had changed. Moreover, the inflexibility and immobility of the SA-1 system and the

magnitude of effort involved in its deployment also argued against its use in other, less critical areas.

36. Since late 1957, the USSR has been acquiring a major operational capability with a second-generation surface-to-air missile system which appears designed to cope with the threat posed by small numbers of aircraft carrying nuclear weapons rather than a massed raid threat. A typical site consists of six revetted launching positions deployed around a guidance radar and linked by service roads to facilitate loading. Maximum intercept range of the SA-2 system is estimated at 25-30 n.m., but will vary depending upon type of target, approach angle, and other operational factors. Maximum altitude capability is about 60,000 feet, with some effectiveness up to 80,000 feet. The system apparently is not intended for use against low altitude targets. Against subsonic targets, low altitude capability will probably average about 2,500 feet, but variations in such factors as siting conditions and target speeds could result in low altitude limits as low as 1,000 feet or as high as 7,000 feet. Against supersonic targets, low altitude limits would be higher. There is some evidence that the Soviets themselves consider that a minimum SA-2 engagement altitude would be about 10,000 feet, but we do not know the circumstances assumed in the Soviet calculations.

37. Flexibility and mobility are the chief advantages of the SA-2 over the SA-1. Even at fixed installations, all operating components of the system are mounted on wheeled vehicles and can be transported by road or rail. Moreover, in contrast to the limited sector covered by an SA-1 site, each SA-2 site appears capable of 360 degrees coverage. The SA-2 system can, at relatively low cost, be deployed widely for defense of large cities, of small but important fixed facilities, and of forces in the field.

38. Considering the pattern of SA-2 deployment, the length of time the program has been underway, and the extent of our intelligence coverage, we estimate that 350-400 sites (each with six launchers) are now operational at about 70 defended areas in the USSR. By

² For a more detailed consideration of this subject, see NIE 11-3-61, "Sino-Soviet Air Defense Capabilities Through Mid-1966," dated 11 July 1961, TOP SECRET.

mid-1962, the Soviets probably will have deployed roughly 500 SA-2 sites at about 100 urban-industrial areas in the USSR. There is little evidence on the level of defense to be provided for field forces, but we estimate that some 80-120 mobile missile units may be deployed by the end of 1963 for the protection of such semifixed targets as major headquarters and logistic centers. We believe that the USSR intends to provide SA-2 defenses for the fixed launching complexes of its long range ballistic missile forces, but we are unable to estimate the level and extent of defenses planned.

39. Deployment of SA-2 sites in the European Satellites has been underway for more than a year. The heaviest deployment has occurred in East Germany, where as many as 20 sites may be operational or under construction. Some of these, located on a ring around Berlin, are manned by East German forces; others, which defend important Soviet military targets, are assigned to Soviet field forces. We believe that additional SA-2 sites will be deployed in the Satellites during the next year or two, and that some mobile units may be provided for Satellite ground forces. We have no reliable evidence indicating the deployment of surface-to-air missiles in Communist China.

40. The Soviets have had under development a surface-to-air system (SA-3) which we believe is specifically designed to engage targets at very low altitudes (i.e., down to about 50 feet). This system is probably being introduced into operational service in 1961. We believe that the Soviets will seek to provide some defense against low altitude attack for most of those areas defended by the SA-1 and SA-2. The Soviets will take into account the relative vulnerability of these areas to low level attack and their ability to bring other defensive weapons to bear. Areas immediately adjacent to coastal waters would probably be regarded as especially vulnerable to low altitude attack. Considering the scale and pace of the SA-2 program, we believe that SA-3 will be extensively deployed within the next three or four years, supplementing exist-

ing missile defenses of fixed targets and field forces.

Antimissile Program

41. To develop defenses against ballistic missiles, the Soviets have had underway for several years an extensive and high priority program which we believe to be directed primarily toward defense against IRBMs and ICBMs, although most of the research and testing to date has been against short and medium range missiles. We have no basis for a firm estimate on the date of initial operational deployment of a Soviet antiballistic missile system or its effectiveness against the various types of Western ballistic missiles. For political as well as military reasons, the Soviets probably would wish to deploy antimissile defense in a few critical areas even if the available system provided only a limited, interim capability. Considering these factors and the present status of the Soviet research and development program, we estimate that in the period 1963-1966 the Soviets will begin at least limited deployment of an antimissile system. We believe that for some years to come, the Soviets are likely to have only a marginal capability under most favorable conditions for interference with US satellites. With an extensive effort, it might be accomplished with a nuclear armed 700 or 1,100 n.m. missile launched on collision course from a test range if the orbital parameters were established.

Fighter Aircraft

42. Although the Soviets are clearly placing heavy reliance on surface-to-air missiles, they continue to maintain large numbers of fighter aircraft in service. As of mid-1961, we estimate that there were about 11,000 fighters in active operational units throughout the Bloc, with about 6,500 in Soviet units. About 4,400 of the Soviet fighters are in Fighter Aviation of Air Defense (IA-PVO) with air defense as their exclusive mission. The remainder, which are in Tactical Aviation, have an air defense responsibility included in their ground support role. With the elimination of the naval fighter force and large-scale reductions

in tactical fighter units, the Soviet fighter force has been reduced by about one-third over the past two years. We believe that phasing out of older aircraft will continue over the next five years resulting in a further reduction on the order of 50 percent.

43. Day fighters—primarily the subsonic FRESCO (MIG-17)—make up over three-quarters of the Soviet fighter force. However, since about 1955 the Soviets have been working to improve the all-weather capability of the force, bringing into service about 400 FLASHLIGHT A (YAK-25) all-weather interceptors and nearly 500 modified day-fighters (FRESCO D and E and FARMER B and E) which have limited all-weather capabilities.

44. During the past year, a new generation air-to-air missile-equipped Soviet fighter has appeared in peripheral areas of the USSR and Eastern Europe. At least three new aircraft appear to be involved: FISHBED C (MIG-21), a Mikoyan-designed, delta-wing interceptor, and two Sukhoi designs—the swept-wing FITTER B and the delta-wing FISHPOT B. These aircraft are all based on prototypes first displayed in 1956. In armament, fire-control, and speed (about 1,000 knots at 35,000 feet), they represent significant advances over the bulk of Soviet interceptors now in service. We estimate that about 400 of these new generation fighters are now in units.

45. The recent Aviation Day show provided new indications on present trends in Soviet research and development on interceptor aircraft. Of the several prototypes displayed, the one which may be of greatest significance to Soviet air defense concepts is an aircraft tentatively nicknamed the FIDDLER. Its size, configuration, very large radar, and missile armament indicate that FIDDLER is probably a long range all-weather interceptor with a maximum speed about Mach 1.6 at optimum altitude and a combat radius of as much as 1,000 n.m. This would mark a departure from previous Soviet fighter designs, which have generally sacrificed range to altitude and climb capabilities. The FIDDLER may be designed to operate in peripheral areas beyond the range of existing Soviet fighter and surface-to-air missiles, so as to

intercept Western bombers before they have launched their missiles.

46. Another interceptor prototype, tentatively nicknamed FLIPPER, bears out previous estimates of the probable trend in Soviet fighter design. FLIPPER is a large delta-wing type, equipped with air-to-air missiles and an airborne intercept radar which is probably superior to that of the FISHPOT. Maximum speed is tentatively estimated at Mach 2 to 2.5 and altitude capability may be as great as 70,000 feet. Although there is no evidence that these aircraft are in current production, we continue to estimate that another new generation of Soviet interceptors will enter operational units within the next few years.

47. Most of the operational fighters displayed in the Soviet air show were equipped with air-to-air missiles (AAMs) which appeared to correspond to previously known or estimated types. These include a radar beam-rider (AA-1), an infrared homing missile (AA-2), and a semiactive radar homing missile (AA-3). Two new air-to-air missiles, probably prototypes, were also observed. One type was carried by the FLIPPER prototype interceptor; the other type, carried by FIDDLER, was considerably larger than any currently operational AAMs, indicating a longer range capability. Estimated performance characteristics are not yet available, but we believe that the new missiles probably incorporate more sophisticated guidance and possibly other improvement.

Antiaircraft Guns

48. The Soviets continue to employ large numbers of antiaircraft guns for defense of field forces and fixed targets, although these numbers have declined during the past two years. Considering the widespread deployment of surface-to-air missiles, we believe that most of the remaining medium and heavy guns will be phased out of the defenses of static targets in the USSR over the next year or so. Light AAA probably will be phased out in areas where the SA-3 is deployed, but will be retained for low altitude defense of other targets.

Supporting Equipment

49. Some 1,200-1,500 heavy prime radars and 4,000-4,500 auxiliary radar are deployed at nearly 2,200 sites in the Sino-Soviet Bloc. Radar coverage now extends over the entire USSR and virtually all the remainder of the Bloc. Under optimum conditions this system now has the capability to detect and track aircraft at medium and high altitudes within 200-250 n.m. of Bloc territory; under virtually all conditions, the system could detect and track such aircraft within about 135 n.m. Soviet efforts to reduce the vulnerability of their air defense radars to electronic countermeasures have included use of greater frequency diversity and increased power. In developing new radars, the Soviets probably will concentrate on improving present limited capabilities against low altitude targets and against air-to-surface missiles.

50. The most important advance in Soviet air defense communications and control over the last few years has been the development and deployment of semiautomatic systems with data-handling equipment for rapid processing of air defense information and data link equipment for vectoring interceptors. Similar systems probably are used with surface-to-air missile units. These new systems will have a marked effect in reducing reaction time and vulnerability to saturation, increasing information handling capacity, and improving coordination within the air defense system.

Deployment

51. Air defense weapons and equipment are most heavily concentrated in that portion of the USSR west of a line drawn from the Kola Peninsula to the Caspian Sea, in East Germany, Poland, and Czechoslovakia, and in the southern portion of the Soviet Far East. Concentrations are found at some specific locations outside these areas, especially in the Urals. The approaches to Moscow are by far the most heavily defended area of the Bloc.

Civil Defense

52. About 80 million Soviet citizens over the age of 16 have received some instruction in civil defense and about one-fourth of these

have probably received good basic grounding in elementary civil defense techniques. The bulk of the population still lacks adequate shelters, although the USSR has a substantial lead over any of the Western Powers in the construction of urban shelters which could provide some protection against fall-out, debris, and fire. In the past two years, the Soviets have given increasing attention to pre-attack evacuation of nonessential civilians in the event of a threatening situation, but this program appears to be still in the planning stage. Even with limited warning, the existence of a disciplined organization, the use of shelter, and the widespread knowledge of simple techniques such as first aid would probably reduce casualties considerably, especially among key personnel. However, Soviet civil defense is not prepared to cope with the effects of large-scale nuclear attack. Moreover, it would function extremely poorly under conditions of short warning time.

Warning Time

53. The amount of warning time available significantly affects the capabilities of air defense in various areas of the Bloc. Early warning radar could now give Moscow and many other targets in the interior more than one hour's warning of medium and high altitude attacks made with Western bombers of the B-52 type. Soviet assurance of such detection would be greatly reduced by extremely low level penetration. The supersonic bombers and air-to-surface missiles now being added to Western inventories could reduce this warning time by as much as 50 percent. Moreover, the more limited early warning time available in Bloc border areas would reduce the effectiveness of the defenses of even heavily defended targets in such areas. As the speeds of Western aerodynamic vehicles increase, and as Western ballistic missiles become a greater threat, the problem of warning time will become more critical.

Current Capabilities and Future Trends

54. The present capabilities of the Soviet air defense system would be greatest against penetrations by subsonic bombers in daylight and clear weather at altitudes between about

3,000 and about 45,000 feet. Under such conditions, virtually all types of Bloc air defense weapons could be brought to bear against attacking aircraft. Most Soviet fighters can operate at altitudes up to about 50,000 feet, and some up to about 55,000 feet, but the capabilities of the fighter force would be reduced considerably during periods of darkness or poor visibility. In the increasingly widespread areas defended by surface-to-air missiles, air defense capabilities would be virtually unimpaired by weather conditions and would extend to about 60,000 feet, with some capabilities up to about 80,000 feet.

55. Despite its recent and considerable improvements, however, the Soviet air defense system would still have great difficulty in coping with a large-scale air attack employing a variety of weapons and sophisticated tactics, even within the foregoing altitudes. At altitudes below about 3,000 feet, the capabilities of the system would be progressively reduced; below about 1,000 feet, the system would lose most of its effectiveness. At present, the USSR has little capability for active defense against very low altitude attacks.

56. The Soviets are making vigorous efforts to counter Western weapon systems. Within the next five years, they will probably introduce improved radars and all-weather interceptors, a surface-to-air missile system designed to counter low altitude air attack, and antimissile defenses. However, they probably will still not achieve a high degree of assurance in coping with a large-scale sophisticated attack by manned bombers. They would probably expect to destroy a large number of the attackers, but given the increasing complexity of the air defense problem, we doubt they will be confident of the extent to which they can reduce the weight of such an attack. The air defense problem has been radically altered by the advent of long range ballistic missiles. Barring an unforeseen technological breakthrough, the USSR's air defense deficiencies and uncertainties will sharply increase as ballistic missiles assume a larger proportion of the West's total nuclear delivery capability.

THEATER FIELD FORCES

General

57. The Soviet ground forces, which represent the largest part of the Soviet military establishment, are well-balanced and equipped with excellent materiel. Air support for these forces is provided by Tactical Aviation and by military transports assigned to the Airborne Troops. Long Range Aviation and the Rocket Forces would also support theater operations in addition to fulfilling their primary missions. Combat troops are distributed among the 15 military districts in the USSR and the three groups of forces in the European Satellites. The strongest concentrations are East Germany, the western and southern border regions of the USSR, and the maritime area of the Soviet Far East.

58. Soviet ground forces are organized into field armies with combat and service support for the line divisions. The complement of support is heaviest in certain key areas, such as East Germany. Units of Tactical Aviation are organized into tactical air armies under the operational control of the military district or group-of-forces commander. Other supporting units include large numbers of artillery, missile, and antiaircraft artillery brigades and regiments which are either assigned to field armies or retained under higher command headquarters.

59. Developments of the past two years have significantly affected the composition and capabilities of the theater field forces. Of the personnel reductions actually carried out, about half probably came out of the ground forces. We believe that these reductions have been accompanied by a greater emphasis on armored mobility and firepower in ground formations and a growing reliance on guided missiles and unguided rockets for support of field force units. Tactical fighter and light bomber forces were sharply reduced, although some of the remaining units have been strengthened by the addition of new fighters. Airlift capabilities have also improved with the introduction of new transports and helicopters.

Strength and Composition of Ground Forces

60. The total number of line divisions as of 1 July 1961 is estimated at about 147 including 26 tank divisions, 87 motorized rifle and mechanized divisions, 26 rifle divisions, and 8 airborne divisions. Approximately 90 divisions are believed to be sufficiently manned (averaging about 70 percent of authorized strength) to be classed as combat ready. The remainder, including most of the rifle divisions, are at such low strength (averaging less than 40 percent) as to require considerable buildup before being committed. These totals represent a reduction of about 20 line divisions, for the most part low strength rifle divisions, since the announcement of force reductions in January 1960. At that time the number of line divisions was estimated at about 170, of which 100 were classed as combat ready.

61. We believe that present force levels will be maintained for some time to come. Khrushchev has raised the possibility of increasing the size of the Soviet armed forces, but we doubt that the ground forces will be substantially enlarged except perhaps in a highly tense situation. The Soviets now have on hand sufficient trained manpower and probably sufficient reserve stocks of equipment to double the number of their divisions in one month. These divisions would, of course, require several weeks training and additional support before they could be fully effective. Although there were indications last year that the Soviets might have been planning the organization of "territorial" reserve forces along the lines of the US National Guard, we believe that the USSR has not established an organized mobilization structure outside the active armed forces.

Ground Forces Weapons

62. The program of modernization and reorganization of Soviet ground forces has involved the introduction over the last several years of more advanced designs of practically all types of equipment, including tanks, armored personnel carriers, nuclear-capable free rockets with ranges to 35 n.m., ballistic and antiaircraft guided missiles, artillery and anti-

aircraft pieces, recoilless antitank weapons, and a wide variety of transport vehicles. In some instances, there have been two successive generations of weapons since World War II. The increasing number of tracked and wheeled amphibians and amphibious tanks has greatly improved Soviet river-crossing capabilities. A few types of specialized weapons have been produced for airborne troops, but for the most part airborne units are armed with standard infantry weapons. Present trends in the ground weapons development program point to a continuing emphasis on firepower and mobility. Specific areas of concentration probably will include defensive weapons against low-flying aircraft, air transportable weapons and equipment, weight reduction of existing equipment, and improved communications.

63. Soviet development of guided missiles has greatly improved the fire support available to field forces. Road mobile surface-to-surface ballistic missiles with maximum ranges of 150 n.m. (SS-1) and 350 n.m. (SS-2) have been available for several years. The SS-1, a second-generation missile which uses storable liquid propellants, became operational in about 1957, and the SS-2 in about 1954. Depending upon operational considerations and the availability of nuclear materials, HE, nuclear, CW, and BW warheads could be employed in all these weapons. We believe that the SS-1 and SS-2 missiles are intended for use primarily in a ground support role, and are assigned to direct operational control of field commanders. Evidence on training indicates the activation of SS-1 and SS-2 units in substantial numbers. We estimate that about 30 SS-1 battalions (with six launchers each) and 30 SS-2 battalions (probably with two launchers each) are now operational. Although there is little evidence on their deployment areas, these missile systems are probably located in the artillery support structure of major Soviet theater field force commands. We believe that the numbers of SS-1 and SS-2 units will remain fairly stable over the next few years. However, within the next year, the Soviets probably will begin replacing the SS-2 with an improved, follow-on system of similar range.

64. A 700 n.m. ballistic missile (SS-3) probably entered service in 1956, and a 1,100 n.m. ballistic missile in late 1958 or early 1959. Nuclear warheads would probably be used in virtually all 700 n.m. and 1,100 n.m. missiles. MRBMs will probably be used in support of theater operations; at least in the initial phase of a general war their employment would be largely against Western nuclear attack forces and major urban-industrial areas. It seems likely that operational control of such missiles is retained in Moscow, and at least most of them are probably directly under the Commander in Chief of Rocket Troops.

Air Support

65. During the past two years Tactical Aviation has undergone drastic reductions. Jet fighter strength was reduced from about 4,000 to about 2,000 through deactivation of units with older models and transfers to the IA-PVO. The assignment of FISHBED C to Tactical Aviation units suggests a close support function for this aircraft in addition to its intercept role. During the next five years, tactical fighter strength probably will be further reduced by about 50 percent. Light bomber and reconnaissance units, equipped with the obsolescent BEAGLE, were cut from about 2,400 aircraft at the beginning of 1960 to about 800 aircraft as of mid-1961. The remaining BEAGLES will also be phased out in time, but we believe that the strength of tactical bomber/reconnaissance units will be stabilized at about 500 by the introduction of new aircraft. An incipient trend of a few years ago to provide medium bombers to Tactical Aviation has been reversed. There remains at present one division of 75 BADGERS but we believe it will be deactivated or transferred to Long Range Aviation within a few years.

66. Among the new aircraft shown in the recent Soviet air show was a new tactical airplane, tentatively nicknamed FIREBAR. Described by the Soviets as a multipurpose type, it could probably be used for ground attack, bombing, and reconnaissance missions. Some of the 10 FIREBARs displayed were equipped with a belly radome, suggesting installation

of bombing/navigation radar; one was configured as an all-weather fighter. Its maximum speed is tentatively estimated at about Mach. 1.5 and its combat radius on a ground support mission is about 150 n.m. FIREBAR is clearly a new aircraft, though it appears to be a further development along the lines of FLASHLIGHT B, a ground support version of the all-weather interceptor FLASHLIGHT A. Some 27 FLASHLIGHT Bs were displayed, indicating probable operational use in at least limited numbers. In addition, FIDDLER may be adapted for use as a long range tactical strike aircraft.

67. Soviet military transports are under the administrative authority of Military Transport Aviation which furnishes airlift support to all Soviet military forces except the Navy, and coordinates military air transport activity. The Soviet Navy has its own air transports. Military Transport Aviation has about 1,700 light and medium transports, almost all of which are allocated to the support of various forces: Long Range Aviation, IA-PVO, Tactical Aviation, and Airborne Troops. About 75 are retained in a headquarters unit to provide air support for the staff of the Ministry of Defense. Transports assigned in support of Airborne Troops also provide a general purpose pool for the support of all major cargo and personnel lifts of the Soviet armed forces.

68. Approximately 220 light transports of the CAB, COACH, and CRATE types and about 350 medium transports are assigned by Military Transport Aviation to support of Airborne Troops. More than 250 of the latter are the new medium turboprop transports CAT, CAMP, and CUB, the latter two being specifically designed for military transport use. The remainder of the medium transports are converted BULL piston medium bombers. The assigned transports of the Airborne Troops are sufficient to airlift simultaneously the assault echelons of two current-type (9,000 man) airborne divisions. Each divisional assault echelon would be limited to about 6,000 troops, including headquarters elements, nine rifle battalions, and light regimental support elements. Divisional combat and service support as well as transport vehicles of the rifle companies

would not be included. A second sortie of the entire transport force would be needed to deliver the balance of the two divisions.

69. The limitation on Soviet airlift capabilities caused by a lack of heavy drop capability and a shortage of assault aircraft have been reduced in the past year, and the probable addition in the future of more of the new type transports will enhance Soviet capabilities to lift large numbers of troops or cargo to peripheral areas. We believe that by the end of the period of this estimate, transports assigned to support of Airborne Troops will have the capability of transporting in a single lift the assault echelons of about five airborne divisions or about two and one-half full airborne divisions. Soviet airlift capabilities could be augmented by about 375 jet and turboprop transports now in Civil Aviation; these include the CAMEL jet medium transport, the CAT and COOT turboprop medium transports, and limited numbers of the CLEAT, a turboprop heavy transport. These aircraft together have an airlift capability of nearly two additional divisional assault echelons. We believe that the two high performance light transports, the TU-124 jet and the AN-24 turboprop, probably are now in operational status with Civil Aviation and will rapidly replace the outmoded and uneconomical CAB, COACH, and CRATE.

Amphibious Capabilities

70. Using all available naval landing ships and craft, the Soviet amphibious assault capability varies from a maximum of one battalion in the Northern or Pacific Fleet areas to two regiments in the Baltic. For longer range operations, the Soviets possess a total merchant ship lift³ sufficient to transport approximately 20 motorized rifle divisions; however, such a lift would require port or other extensive off-loading facilities in the landing area. The Soviets are apparently seeking to further develop their amphibious lift capability, but significant improvement will depend upon their acquisition of additional amphibious craft, extensive training, and reliable logistic support.

³ See Table 15, Annex B.

Capabilities for Land Warfare

71. The Soviet theater field forces have continuously developed and maintained capabilities for the conduct concurrently or separately of large-scale invasions of areas peripheral to the Communist Bloc such as Western Europe, the exits of the Baltic and Black Seas, northern Norway, and Turkey and Iran. We do not believe that this capability has been significantly impaired by force reductions. Forces in the border areas and the Satellites could effectively initiate combat operations without prior reinforcement. We believe that decreases in troop strength have been largely offset by improvements in mobility and firepower. Land campaigns launched from the periphery would be supported by air and missile forces. Naval forces would be available for operations in Bloc coastal areas in support of ground campaigns. In a general war, Soviet capabilities to undertake major theater campaigns would depend upon the outcome of the nuclear exchange.

NAVAL FORCES

72. The USSR has developed an increasingly diversified naval force, capable of long range submarine operations and of surface and air operations in areas adjacent to the Bloc. Since the conclusion in 1957 of an intensive postwar shipbuilding program, new ship construction has continued at a modest pace, with main emphasis given to qualitative improvements. Soviet surface forces, which include cruisers, conventional destroyers, and escort ships, have been strengthened by the addition of guided missile destroyers, new antisubmarine and mine warfare ships, and patrol craft equipped with missiles or rockets. Nuclear-powered submarines and missile launching submarines have entered service, and some older submarines have been modernized. Attack capabilities of Naval Aviation have been improved by additional medium bombers equipped with air-to-surface missiles, while its fighter arm has been eliminated. The Soviet Navy is organized into four widely separated fleets. In recent years, the Soviet Northern and Pacific Fleets, with access to the open seas, have been reinforced by transfers

from the land-locked Baltic and Black Sea Fleets.

73. The Soviet Navy does not have a reserve fleet of major ships in a decommissioned status. However, a number of ships are in a state of reduced readiness with a reduced complement. Allowing for ships undergoing trials, training, overhaul, or with reduced manning, we estimate that roughly two-thirds of Soviet surface ships and perhaps a larger proportion of Soviet submarines are normally capable of operations on a few days notice. Overall readiness of the fleet as a whole for combat operations could be increased to about 85 percent with six months notice.

Submarine Force

74. Soviet naval capabilities for conducting long range offensive operations rest primarily upon the submarine force. Its numerical strength appears stabilized for at least the next few years at about 360 first line and a declining number of second line ships. However, its composition is changing significantly. In addition to improved conventional submarines armed with torpedoes, we believe that the force now includes 21 conventionally-powered missile submarines and about 7 nuclear-powered submarines, most of which probably are equipped with missiles. Including nuclear-powered ships, about 65 Soviet submarines are believed capable of operating near the continental US from bases in the USSR.

Nuclear Submarines

75. The USSR has actively pursued the development of nuclear-powered submarines for a number of years. There is evidence that the first such submarine was launched in 1958 at the Severodvinsk shipyard in the northern USSR. After fitting out and trials, this submarine probably joined the Northern Fleet in late 1959. We estimate that about seven of these submarines are now operational with the Northern Fleet. We believe that these submarines are probably of the new "H" class. The direct evidence on the "H" class propulsion system is inconclusive except that it excludes the use of conventional diesel or bat-

tery propulsion. Considering all available evidence, we have concluded that the "H" class probably is nuclear-powered, but we have insufficient information to estimate its performance characteristics or reliability. The similarity of the "H" class sail to that of the "G" class indicates that it, too, probably carries ballistic missiles.⁴

76. The USSR has a strong requirement for conventionally armed, nuclear-powered submarines for offensive operations against surface forces and for employment in antisubmarine warfare. We believe that, within the next few years, other classes of Soviet nuclear-powered submarines will enter service, including both torpedo attack and missile-launching types. Two Soviet shipyards are believed to be engaged in nuclear submarine production, Komsomolsk in the Soviet Far East and Severodvinsk. Total production of these two yards will probably be up to eight per year over the next five years. On the basis of available evidence, Soviet requirements, and production capabilities, we estimate a buildup in Soviet nuclear submarine strength to 22 in mid-1963 and 46 in mid-1966. We estimate that by the end of the period about half of these ships will be missile-launching types, and about half, torpedo attack.

Conventionally-Powered Submarines

77. The bulk of the Soviet submarine force consists of conventionally-powered, torpedo attack submarines, built for the most part in the early and mid-1950's. These include some 205 "W" class, 20 "Z" class, and 30 "Q" class submarines. The 11 submarines of the newly designated "R" class are believed to be "W" class conversions, whose appearance suggests general modernization with improved sonar equipment. Six "Z" class submarines have undergone conversion to launch ballistic missiles. Since 1958, the Soviets have produced about 19 "F" class large, long range submarines with improved sonar equipment

⁴Present capabilities and future trends in Soviet missile-launching submarines, both nuclear and conventionally-powered, are discussed under Forces for Long Range Attack, paragraphs 28-34.

of which 17 are operational, and 15 of the "G" class missile-launching ships.

78. Soviet conventional submarines are capable of mounting a large-scale torpedo attack and mining campaign against Allied naval targets and sea communications in the eastern North Atlantic and northwestern Pacific. The 37 "Z" class and "F" class torpedo-attack submarines, the 15 "G" class missile submarines, and the 6 "Z Conversion" class are believed capable of operating near the continental US from Soviet bases. The missile launching types can also conduct torpedo attack and mining operation. The Soviets will probably build a few more "G" and "F" class ships, but considering their present strength and probable requirements, we believe that construction of conventionally-powered submarines will have ended by early 1963.

Surface Forces

79. Soviet naval surface forces, which are heavily dependent upon land-based logistic and air support, appear suited primarily for defensive operations in waters adjacent to the USSR. Conventionally-armed, major surface units now stand at about 22 cruisers, 113 conventional destroyers, and 66 escort ships.

80. The only type of major surface combatant ship now being built in the USSR is the guided missile destroyer. The Soviets now have 11 such ships, armed with cruise-type missiles for use against surface targets and with advanced ASW gear. Of these, 7 are of the "Krupnyy" class, each of which has two launchers and carries an estimated 18 missiles; the 4 ships of the earlier "Kildin" class each carry one launcher and 8 missiles. Two types of missiles are employed—SS-N-1 and SS-N-2—both of which have speeds in the Mach 1 region and an effective range of 20-30 n.m. With the use of aircraft for forward observation, the maximum range of the SS-N-1 missile can be extended to about 100 n.m., and that of SS-N-2 to about 80 n.m. Current Soviet production of missile destroyers, including the "Krupnyy" class and a new class called the "Kynda," is estimated at six per year. A number of conventionally-armed de-

stroyer types have been modernized by the installation of improved equipment for anti-submarine warfare and electronics warfare.

81. Other new construction during the past few years has involved small, specialized craft for use in antisubmarine warfare, amphibious operations, mine warfare, coastal defense, and logistic support. Two classes of patrol boats, equipped with guided missiles or free rockets, are now operational. The Soviet auxiliary fleet, composed primarily of older ships, has recently been augmented by newer tanker and cargo ships, and submarine support has been reinforced by the addition of new submarine tenders, rescue ships, and repair ships. Additional logistic support could be provided by the growing Soviet merchant marine. In terms of net tonnage, additions to the Soviet merchant fleet during 1960 were the largest of any year to date and more than double the 1959 increase. The widespread Soviet fishing fleets can provide limited logistic support to submarines, and they have considerable utility for training, mine warfare, and collection of electronic intelligence.

82. Over the next five years, we believe that cruiser and conventional destroyer strength will continue to decline, while escort ship strength will remain fairly stable. Modernization of destroyer types will continue, and some surface ships may be equipped with surface-to-air missiles. Soviet production of missile destroyers probably will continue at the present rate for the period of this estimate. We estimate that by mid-1966, Soviet first line surface strength will consist of 42 guided missile destroyers, 13 cruisers, 90 conventional destroyers, and 58 escort ships as well as over 100 missile or rocket equipped patrol craft.

Naval Aviation

83. Soviet naval air forces underwent a drastic reduction and reorganization in 1960 with the deactivation or transfer of all naval fighter units and the virtual elimination of light bomber units. The principal components of Naval Aviation are now jet medium bombers, patrol aircraft, and land-based helicopters. Its capabilities are focused primarily on reconnaissance and strike missions against

maritime targets and on antisubmarine warfare. Air cover for naval operations would have to be provided by other than Naval Aviation components.

84. About two-thirds of Naval Aviation's 350 BADGER jet medium bombers are each equipped to deliver one or two antiship air-to-surface missiles. A subsonic missile with 55 n.m. range (AS-1) is the most widely deployed, but it is being supplemented or replaced by a supersonic missile (AS-2), which has a range of 100 n.m. Both systems are estimated to have a CEP of 150 feet against surface ships, and it is likely that a small portion of the inventory is equipped with nuclear warheads. We estimate that the combined Soviet inventory of these antiship weapons will remain fairly stable at about 500 missiles over the next few years. Naval Aviation may receive some BLINDER supersonic dash mediums, but we believe that its medium bomber strength will remain fairly stable or increase slightly during the period of this estimate.

85. Two new flying boats were displayed in the 1961 Aviation Day Show. One of these, a turboprop, is probably intended as a replacement for the obsolescent MADGE. Its equipment with magnetic anomaly detection (MAD) gear indicates an ASW capability. The other, a new turbojet, may be suited for reconnaissance, minelaying, or possibly transport use; however, we estimate that this aircraft will not enter the operational force.

Capabilities for Naval Warfare

86. In addition to the assignment of missile launching submarines to long range attack, the missions of the Soviet Navy encompass three distinct objectives: (a) defense of the maritime approaches to the USSR and critical Satellite areas, including offensive action against hostile naval forces—particularly aircraft carriers and missile-launching submarines—capable of long range attack; (b) interdiction of enemy sea lines of communications; and (c) support of the seaward flanks of the ground forces, including amphibious operations. Of these missions, the Soviets almost certainly attach the greater urgency to strengthening their naval defenses against

strategic attack. Soviet naval forces could provide fire support for ground operations in coastal areas, but capabilities for amphibious assault remain quite limited. The grave threat to Allied sea communications already posed by the Soviet submarine force will probably remain relatively constant.

Capabilities Against Carrier Task Forces

87. The Soviets evidently regard the carrier task force as a major strategic threat. Their capabilities against such forces have been greatly improved by the increased allocation to Naval Aviation of jet medium bombers equipped with antiship missiles. The unrefuelled combat radius of the BADGER, so equipped, is estimated at 1,000–1,600 n.m. depending on the mission profile and type of missile employed. In the European area, therefore, these aircraft could operate against surface ships in the eastern North Atlantic, the Norwegian and Barents Seas, and much of the Mediterranean. These capabilities are, of course, limited by problems of detection and identification, and by carrier task force air defenses. Submarine operations against carrier task forces could extend to US coastal waters. In waters adjacent to the USSR, all types of Soviet naval weapons could be brought to bear against opposing surface forces.

ASW Capabilities

88. The USSR has placed increasing emphasis on the improvement of its previously neglected antisubmarine warfare (ASW) forces. For detection and localization of enemy submarines, the Soviets are employing direction-finding equipment, short range shore-based detection equipment, air launched sonobuoys, helicopters, and airborne MAD equipment. They have made a major effort in the construction of ASW ships, particularly small coastal types, and have equipped some of their destroyers and many smaller surface ships with multiple tube ASW rocket launchers, as well as improved detection equipment. As a result, the Soviet Navy is capable of carrying out fairly effective antisubmarine operations in sea areas within roughly 100 miles of the Soviet

coastline, but is severely limited in carrying out such operations beyond this range.

89. With the development of US missile submarines, the Soviet Navy recently has placed increased emphasis on its open sea ASW needs. ASW exercises have expanded in scope, and training doctrine has become more sophisticated. Both the "F" and "R" class submarines have been fitted with improved sonar, and nuclear submarines suitable for ASW may enter service in the next year or so. There is evidence of developmental work on ASW torpedoes, and although direct evidence is lacking, we believe missiles for ASW may also be under development. The turboprop seaplane which appeared in the 1961 Moscow Air Show suggests the Soviets may be commencing a program to modernize their obsolescent and relatively small force of ASW patrol aircraft. In addition, the Soviets have continued to engage in oceanographic research which could have ASW application.

90. In order to expand significantly their negligible open sea ASW capability, the Soviets would have to initiate a large-scale improvement program. Such a program could include: modification of additional destroyers with ASW rocket launchers, construction of new classes of long range ASW ships, adaptation of larger numbers of "W" and "Z" class submarines and production of nuclear submarines suitable for ASW, construction of long range ASW patrol aircraft with detection equipment designed for wide-area search, installation of shore-based ocean surveillance systems of maritime approaches to the USSR, and several years of intensive training emphasizing coordinated operations. Although the Soviets have shown increased interest in ASW, there is no indication that their improvement program is on such a comprehensive scale. Moreover, it is doubtful, primarily because of geographic factors, that the Soviets can achieve an effective, long range underwater sound detection system to enable them to maintain continuous surveillance over large ocean areas except in the northwestern Pacific. In sum, we believe that over the next five years, the USSR will have only a limited capability to detect, identify, localize, and

maintain surveillance on submarines operating in the open seas.

91. The principal naval weaknesses of the USSR are its inability to control the sea routes between its widely separated fleets and its inability to project its surface forces for offensive operations at great distances from Soviet shores. The lack of adequate supply lines to Northern and Far Eastern fleet areas and the stationing of a major portion of Soviet naval strength in the Baltic and Black Seas have been additional handicaps. However, improvements in logistics and the transfer of ships to the Northern and Pacific fleets have reduced these weaknesses somewhat.

SPECIAL WEAPON DEVELOPMENTS

Nuclear Weapons⁵

92. The 74 Soviet nuclear tests detected since August 1949 have reflected the development of nuclear weapons to meet a wide variety of military requirements. Soviet tests conducted during 1958 included [] thermonuclear devices ranging in yield from []

[] The weapon designs tested in 1958 could now be stockpiled in significant quantities. We estimate that only marginal improvements will be made in future weapons unless nuclear testing is resumed. However, the Soviets now have available a wide spectrum of fission and thermonuclear weapons which is probably adequate to meet their basic military requirements. We estimate that at present the Soviet stockpile probably includes nuclear weapons in the range of tested yields, []

[] In addition, this stockpile might include untested weapons with yields as large as 18 MT.

93. There is insufficient evidence to support a firm estimate of the numbers and types of nuclear weapons in the Soviet stockpile. We believe that the USSR has sufficient nuclear weapons to support massive nuclear attacks against targets in North America and Eurasia

⁵ For a more detailed discussion, see the forthcoming NIE 11-2-61, "The Soviet Atomic Energy Program," 1961 (LIMITED DISTRIBUTION)

by its long range striking forces. The size and nature of the materials stockpiled imposes limitations on the numbers of weapons available for other air, ground, and naval forces. We have estimated a considerable growth in the Soviet fissionable materials stockpile over the next few years, which should keep pace with the estimated growth in Soviet long range attack capabilities as well as easing the present limitations on other military uses.

Chemical and Biological Warfare

94. The Soviet Union is believed to be prepared to use chemical warfare on a large scale. Soviet military forces receive training in the offensive use of toxic chemical agents as well as in defense against them. The amount of toxic agents currently produced in the USSR and the size and disposition of the Soviet stockpile are not known, but are believed to be substantial. At least half of the stockpile probably consists of nerve agents, principally tabun (GA), a smaller quantity of sarin (GB), and some toxic agents of the V-type. We believe that further development could produce only small increases in the toxicity of known agents and that some research probably is being directed toward development of new, lethal agents. The Soviets are also aware of the potentialities on nonlethal, incapacitating agents.

95. The Soviets have developed spray devices for disseminating chemical agents from aircraft, as well as artillery shells and short range rockets dissemination, and it is within their technical capabilities to employ such agents in the warheads of ballistic missiles. Tactical requirements might dictate that toxic chemical warheads be provided for some portion of Soviet ballistic missiles with maximum ranges up to 350 n.m. It is possible that CW agents might be used in the 700 n.m. ballistic missile for certain limited purposes.

96. There is insufficient evidence on which to base a firm assessment of Soviet BW offensive activities. The Soviet Union has a comprehensive biological warfare defensive program; knowledge obtained from the development of this program could lead to an offensive capability. The Soviets have conducted research

on antipersonnel, antilivestock, and possibly anticrop BW agents. No BW agent production facility has been identified, but many existing biological plants could be converted for production of BW agents.

Electronic Warfare

97. A wide range of active and passive equipment for electronic countermeasures (ECM) use is now operational in Soviet air and naval units. The devices, designed to counter Western electronic systems at all the widely used frequencies, include improved chaff, radar, and communications jammers, and various deception devices. Soviet military ECM capabilities are complemented by the unique Soviet experience in extensive, centrally controlled, selective jamming of Western broadcasts. At present, the USSR has an appreciable capability for jamming Western radars at most of the commonly-used frequencies (up to 10,000 mc/s and possibly higher), and especially for jamming at those frequencies normally used in Western long range radio communications. Within the period of this estimate, we believe that it will have in operational use equipment for jamming all frequencies likely to be employed by Western communications, radar, and navigation equipment.

98. Thus Soviet capabilities to disrupt Western strategic and tactical communications at the time of attack appear formidable. The Soviet ground-based jamming capability is most effective within about 500 miles of Soviet territory. In addition, the cutting of trans-Atlantic cables by Soviet trawlers has demonstrated the vulnerability of this communications system. The Soviets probably are aware of at least some of the effects of high altitude nuclear bursts on radar and communications, although they have conducted no such tests.

FORCES IN EUROPE FACING NATO

99. A period of rapid change and reorganization in the Soviet armed forces has altered the military situation in the NATO area. While Soviet and Satellite capabilities in Eastern Europe have remained relatively constant, the Soviet ground, air, and missile strengths in the USSR backing up their forward deploy-

ment have been undergoing considerable change.

100. We believe that there has been a substantial buildup of surface-to-surface missiles covering all of NATO in Europe. The nature and scale of the air threat has changed. Very large numbers of jet light bombers and day fighters have been withdrawn from the order of battle. At the same time, medium bombers of Long Range Aviation are available for use against targets in and near Western Europe. Finally, while the tactical air forces in the north have been virtually eliminated (as have those in the Far East), those in East Germany have actually been increased slightly. The preponderance of Soviet tactical aviation remains in the European area facing NATO.

101. Some of the reductions in 1960 affected the ground forces in the western USSR, reducing the numbers of divisions which could be committed to combat without prior mobilization. Nonetheless, the Soviet ground capabilities remain very considerable, and the Soviets

apparently consider that they retain a superiority for any war in Europe, as well as the base for larger scale mobilization if required.

102. The Soviet naval threat to NATO is changing, with a moderate decrease in older surface and submarine units and an increase in missile-launching ships and small craft as well as naval medium bomber antishipping strength. Re-evaluation of Soviet submarine capabilities on the basis of intelligence acquired over the past year or two has indicated that the scale of the submarine threat to shipping near US coasts is much less than heretofore believed, though it remains a great threat to sea communications in the eastern North Atlantic.

103. Soviet ground strength in Eastern Europe remains at 26 combat ready divisions, backed up by 44 combat ready and 27 low strength divisions in the Western USSR from the Barents to the Black Seas, and back to Moscow. Five of these are airborne divisions.

SOVIET LINE DIVISIONS FACING NATO *

AREA	MOTORIZED RIFLE/MECH-				TOTAL
	RIFLE	ANIZED	TANK	AIRBORNE	
<i>Eastern Europe</i>					
Combat Ready	0	12	14	0	26
Low Strength	0	0	0	0	0
	0	12	14	0	26
<i>North Western USSR</i>					
Combat Ready	1	3	0	2	6
Low strength	2	0	1	0	3
	3	3	1	2	9
<i>Western USSR</i>					
Combat Ready	0	17	8	3	28
Low Strength	5	16	0	0	21
	5	33	8	3	49
<i>South Western USSR</i>					
Combat Ready	1	9	0	0	10
Low Strength	0	3	0	0	3
	1	12	0	0	13
<i>Total</i>					
Combat Ready	2	41	22	5	70
Low Strength	7	19	1	0	27
	9	60	23	5	97

* In addition, there are 8 combat ready and 4 low strength divisions in the Caucasus facing Turkey.

104. Soviet Tactical Aviation now has about 175 jet light bombers and 900 fighters in Eastern Europe, and an additional 75 medium bombers, 325 light bombers, and about 1,000 fighters in the European USSR.⁶ The Soviet Navy has some 130 modern long range submarines (including 21 missile launching ships), 3 cruisers, and 50 destroyers and escorts in the Northern Fleet capable of engagement in the North Atlantic, in addition to units in the Baltic and Black Seas. There are about 250 naval BADGER medium bombers with the Northern, Baltic, and Black Sea Fleets. Medium bombers of Long Range Aviation and medium and intermediate range missiles of the Rocket Forces would also be available to support theater campaigns in Europe. We have estimated that the USSR now has a force of medium range (700 and 1,100 n.m.) ballistic missiles which approaches 250-300 operational launchers, the majority of which are deployed within range of West European targets.⁷

105. The Satellite armies have a total of nearly 60 divisions, of varying degrees of effectiveness and reliability. The Satellites together have about 125 light bombers, and about 2,100 fighters intended primarily for air defense. None of the Satellites have effective naval combat forces. There will probably be continuing modernization, and modest reductions, in Satellite standing forces in the years ahead.

106. Soviet forces in East Germany represent a powerful armored striking force of 10 tank and 10 motorized rifle divisions, with well over 5,000 tanks, and supporting artillery and other units. These forces are combat ready, and at a generally high state of readiness which reaches a peak in the early autumn maneuvers. The USSR has the back-up capability for reinforcement and continuing resupply so long as the logistical lines from the USSR are intact. In local actions arising out of the Berlin situation, the Soviets could of course

use their own forces, but probably would use East German forces, at least initially.⁸

107. Soviet forces stationed in East Germany are equipped with dual-capable weapons and carriers. There is some evidence that nuclear warheads are presently stocked in East Germany for Soviet forces, although storage sites have not been identified. There are almost certainly no nuclear weapons in the other Satellite countries. The Soviets could readily provide tactical nuclear weapons to their forces in Eastern Europe, although we do not know on what scale these weapons are available in the Western USSR for use by the Soviet ground and tactical air forces.

CAPABILITIES FOR DISTANT, LIMITED MILITARY ACTIONS

108. Soviet theater forces, including ground armies and supporting air and naval strengths, are primarily designed to conduct large-scale campaigns in areas contiguous to the Bloc. In recent years, there has been a tendency on the part of the Soviets to concern themselves politically with critical situations at considerable distances from centers of Bloc power: for example, in Laos, Cuba, and the Congo. The Soviet attitude with respect to such situations has more than once implied a threat of military intervention. We do not believe that the USSR intends as a matter of policy to conduct limited war in areas remote from the USSR, but occasions may arise where a military presence or show of force would be regarded by the Soviets as useful.

109. In any present effort to deploy military forces rapidly to distant areas, and to maintain them once deployed, the USSR would be greatly handicapped, partly by limitations on air and sealift and even more by the lack of political arrangements to insure adequate logistic support. Moreover, the USSR has not established any special military component trained and equipped specifically for independent small-scale operations, although of course it could employ portions of its existing

⁶For detailed disposition of Soviet aircraft, see Table 7 of Annex B of this estimate.

⁷See NIE 11-8-61, "Soviet Capabilities for Long Range Attack," dated 7 June 1961, TOP SECRET.

⁸The capabilities of the East German forces are assessed in SNIE 12.4-61, "Stability of East Germany in the Berlin Crisis," dated 15 August 1961, SECRET.

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forces. During the past year the USSR demonstrated in Laos the capability to provide small-scale airlift on a distant periphery of the Bloc.

110. It is possible that over the next few years the Soviets will seek to improve their capabilities for distant, limited military operations through the designation and training of appropriate forces, and the development of suitable equipment for their use and logistic support. They may attempt to overcome their geographic disadvantage for applying such forces by negotiating with neutralist countries to utilize available facilities for refueling and maintenance of Soviet military aircraft or naval ships. A recent Soviet proposal to man one of Mali's main airports with Soviet technicians, including communications specialists, in order to service the transport aircraft obtained by Mali, Guinea, and Ghana from the Bloc, may represent a move toward the same end.

MILITARY RELATIONSHIPS WITH OTHER BLOC COUNTRIES

111. Political relationships among the Communist countries vary considerably, and the degree and forms of military cooperation vary accordingly. The USSR has a much closer tie and more dominant role over the Eastern European Satellites (excepting Albania) than it does over the Asian countries, particularly Communist China. The forces of the Warsaw Pact, again excepting Albania, are clearly tied operationally to the Soviet military establishment. Their air defense forces are integrated into the Soviet air defense system, and from time to time the Soviet and Eastern European ground and tactical air forces conduct combined exercises. In contrast, there is no evidence of any combined exercises of Soviet with Chinese, North Korean, or North Vietnamese forces. Moreover, there is evidence of both Chinese Communist and Soviet refusals to arrange combined commands, joint or reciprocal use of military facilities, and joint construction of installations on one another's territory.

112. The USSR has used the Warsaw Pact both as a political instrument, and as the channel for control at the highest level over

the Eastern European Communist forces. The Soviets have reduced the exercise of direct control of Satellite military establishments by removing almost all Soviet officers previously stationed within those forces. However, the Soviets have retained substantial forces in East Germany, Poland, and Hungary. The whole of the Satellite area is a valuable defensive glacis and extension of air defenses for the Western USSR. Accordingly, the Satellites are provided nonnuclear surface-to-air missiles and fighter interceptors, while the USSR retains for itself offensive air, naval, and missile nuclear striking forces.

113. A marked change has occurred in the past year in Soviet military relations with Albania, as a result of the deterioration of political relations. While Albanian ties with the Warsaw Pact have not been severed, military cooperation has been sharply reduced. Military attaches have been withdrawn from Tirana and Moscow, and Albanian students under military training in the USSR have apparently returned home. The Soviet Union has evacuated its submarine base at Valona, withdrawing its eight submarines and one tender which had been based there. The remaining four submarines and one tender of the Albanian Navy do not possess a significant combat capability. There is evidence that in the past year the Soviets have threatened the Albanians with withdrawal of the protection afforded by the Warsaw Pact if its leaders refused to accede to Moscow's political line.

114. Sino-Soviet military cooperation reached its zenith during and in the wake of the Korean War. Military assistance had been slight before 1951, and has again been slight during the past five years. In the early and mid-1950s the Soviets supplied large quantities of ground force weapons and jet fighters, some piston and jet light bombers, and a few destroyers and submarines. At the same time, substantial numbers of Soviet military advisors—in the low thousands—assisted in training the Chinese. Subsequently, particularly from about 1955 to 1959, the USSR assisted the Chinese in developing their own conventional weapons production base, and assistance in training tapered off.

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senting down payments and discounts. The USSR has signed agreements accounting for roughly two-thirds of the total, Czechoslovakia for about one-fourth, and Poland and Communist China for the rest.

121. In terms of value received or promised, Indonesia, the UAR, and Iraq—in that order—have been the principal beneficiaries of Bloc arms aid; Bloc agreements signed with these countries probably account for something in the neighborhood of 85 percent of the total nominal value. In rough terms Bloc agreements with Indonesia (chiefly those of 1960–1961) are responsible for around 40 percent of the total, with the UAR (including the probable agreement of 1960) for about one-third, and with Iraq for about 10 percent. Afghanistan and Cuba together account for 10 percent or so; the remainder has been divided between Yemen, the Algerian rebels, Morocco, Guinea, and Mali.

122. The estimated value of Bloc military material supplied to Cuba now totals between \$60,000,000 and \$100,000,000. Shipments have included MIG-type jet fighters (more than 20 delivered in May and an additional quantity in June), piston trainers, light transports, helicopters, a wide range of conventional land armaments, and large quantities of infantry weapons. In addition, between 150 and 200 Cuban personnel have probably been receiving military training in Czechoslovakia, and a small number in the USSR. About 300 Bloc technicians are currently working in Cuba in

military capacities—the second largest contingent of such technicians present in a non-Bloc state.

123. Elsewhere, during the first six months of 1961, roughly 1,250 Bloc military technicians, mostly from the USSR, were assigned to duty for one or more months in such countries as the UAR, Iraq, and Afghanistan. The largest number, nearly 500, were in the UAR, though this represented a reduction of about one-quarter from the preceding six-month period. Two hundred or so other technicians were in Indonesia, Morocco, Yemen, and Guinea. Military personnel from these countries who received training within the Bloc (principally in the USSR, Poland, and Czechoslovakia) during the period from January 1955 through June 1961 totalled about 5,000, some 3,800 of whom were from the UAR and Indonesia.

124. During 1961 the Soviets demonstrated a willingness to provide more modern arms to certain recipients. The UAR and Iraq received long-sought MIG-19 (FARMER) fighters. Indonesia is receiving a modern light cruiser and a small number of BADGER medium bombers—items not possessed by Communist China or any of the Satellites—and has been promised MIG-21's and a variety of short range offensive and defensive missiles. In general, however, the Soviet program provides recipients with arms of older types frequently drawn from surplus stocks; thus demands on current Soviet military needs are minimal.

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MAJOR BLOC ARMS PROVIDED SELECTED UNDERDEVELOPED COUNTRIES

(1955-JULY 1961)

	UAR	IRAQ	AFGHAN- ISTAN	CUBA	INDO- NESIA
AIRCRAFT (minimum estimates)					
TU-16 jet medium bombers	—	—	—	—	20 *
IL-28 jet light bombers	60	16	41	—	25 *
MIG-21 jet fighters	—	—	—	—	20 *
MIG-19 jet fighters	40	16	—	10	10 *
MIG-15/17 jet fighters	250	43	69	30	67
Other aircraft, including helicopters ..	80	19	55	49	46
LAND ARMAMENTS (minimum estimates)					
JS-2/3 heavy tanks	60	—	—	21	—
T-34/54 medium tanks	650	300	180	110	—
PT-76 amphibious light tanks	—	—	—	—	80 *
SU-100 self-propelled assault guns ...	170	70	20	50	—
Artillery pieces	2,100	800	633	600	244 *
NAVAL VESSELS					
Cruisers	—	—	—	—	1 *
Destroyers	2	—	—	—	6 *
Submarines	9	—	—	—	6 *
Sub Chasers	—	—	—	—	16 *
Mine Sweepers	6	—	—	—	6 *
Others vessels, including MTB's	33	14	—	—	51 *

* Mostly on order.

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ANNEX B

Table 1

ESTIMATED PERSONNEL STRENGTH OF THE SOVIET ARMED FORCES,
1 JULY 1961 • ^b

Ministry of Defense.....		70,000
Headquarters.....	30,000	.....
Research and Development •.....	40,000	.....
Theater Field Forces.....		2,020,000
Ground Forces, Field.....	1,935,000	.....
Tactical Aviation.....	85,000	.....
Air Defense Forces.....		325,000
Surface-to-Air Missiles.....	85,000	.....
Antiaircraft Artillery (Gun).....	50,000	.....
Fighter Aviation of Air Defense.....	105,000	.....
Warning and Control.....	85,000	.....
Long Range Attack Forces.....		100,000
Long Range Aviation.....	65,000	.....
Surface-to-Surface Missiles (SS-3, 4, 5, and 6).....	35,000	.....
Naval Forces (excl. personnel counted elsewhere).....		^d 370,000
Forces Afloat.....	170,000	.....
Shore Establishment.....	160,000	.....
Coastal Defense.....	15,000	.....
Naval Aviation.....	25,000	.....
Military Transport Aviation.....		45,000
Preoperational Aviation Training.....		70,000
		3,000,000
Security Forces (not included in above total).....		225,000
Border Troops.....	150,000	.....
Internal Troops.....	75,000	.....

• There are at present a substantial but unknown number of civilians working for the Soviet military establishment. There is evidence that some functions previously performed by military personnel have in the course of reductions in recent years come increasingly to be filled by civilian employees, particularly in construction and other support activity.

^b The nature of our evidence on reductions in 1960-1961 is necessarily more certain and more precise for those components where a given ratio of personnel to Order of Battle of units and major weapons is clearly established. Consequently, our information on cuts in the air forces is more complete than is our evidence on other components. Evidence on personnel strengths of the administrative and logistical tail, has always been meager and incomplete, and our estimates of these categories must be based on indirect evidence and inference.

• Military scientific research and development in the USSR is largely conducted by civilian agencies, in particular the Academy of Sciences, the State Committees for Defense Technology, Aviation Technology, Scientific-Technical Matters, Radio-Electronics, and Shipbuilding, and by the Ministry of Medium Machine Building (nuclear weapons). The numbers of active duty military personnel estimated here are those primarily subordinate to the Ministry of Defense and at missile test ranges, in electronics, nuclear development, and aviation technology. Other military personnel in Research and Development and allied functions are counted in other categories.

^d The Assistant Chief of Naval Operations (Intelligence), Department of the Navy, believes that the personnel figures for Forces Afloat, Shore Establishment and Coastal Defense are somewhat higher than shown. He believes that the following table is a more accurate reflection of personnel strength in the Soviet Navy:

Naval Forces (excluding personnel counted elsewhere in Table 1)	450,000
Forces Afloat.....	180,000
Shore Establishment.....	210,000
Coastal Defense.....	35,000
Naval Aviation.....	25,000

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Table 2

ESTIMATED MILITARY PERSONNEL STRENGTH OF EUROPEAN SATELLITE AND ASIAN COMMUNIST FORCES, 1 JULY 1961 ^a

	GROUND FORCES	AIR FORCES	NAVAL FORCES	MILITARIZED SECURITY FORCES	ROUNDED TOTALS (EXCLUDING SECURITY FORCES)
EUROPEAN SATELLITES.....	865,000	90,000	50,000	270,000	1,000,000
Albania.....	25,000	2,000	3,000	10,000	30,000
Bulgaria.....	110,000	11,000	8,000	35,000	130,000
Czechoslovakia.....	155,000	25,000	.....	35,000	180,000
East Germany.....	75,000	8,000	11,000	50,000	95,000
Hungary.....	100,000	3,500	.....	35,000	100,000
Poland.....	200,000	^b 30,000	18,000	45,000	250,000
Rumania.....	200,000	10,000	11,000	60,000	220,000
ASIAN COMMUNIST ASIA.....	3,265,000	100,000	75,000	60,000	3,450,000
Communist China.....	2,660,000	^b 86,000	65,000	^c	2,825,000
North Korea.....	330,000	16,000	7,000	25,000	350,000
North Vietnam.....	275,000	^d 450	2,000	35,000	275,000
GRAND TOTAL (Rounded).....	4,125,000	190,000	125,000	330,000	4,450,000

^a Figures in this table are based on estimated order of battle plus headquarters personnel in Ministries of Defense.

^b Includes naval aviation.

^c Public security forces (totaling 200,000 men), which are subordinate to the Ministry of National Defense, are included in the ground force total.

^d Civil air fleet personnel used in a military capacity when necessary.

Table 3

ESTIMATED STRENGTH OF SOVIET GROUND FORCES IN LINE DIVISIONS, 1 JULY 1961 ^{a b}

MANNING LEVEL	RIFLE DIVISIONS			MOTORIZED RIFLE/ MECHANIZED DIVISIONS			TANK DIVISIONS			AIRBORNE DIVISIONS			TOTAL
	No.	TO/E	Actual	No.	TO/E	Actual	No.	TO/E	Actual	No.	TO/E	Actual	
1 July 1961													
Combat Ready.....	6	13,335	8,500	53	13,150	9,400	23	10,630	8,500	8	9,000	6,700	90
Low Strength.....	20	.....	3,500	34	.....	5,000	3	.....	4,000	..	.....	.....	57
													147

^a Additional Soviet combat units include 10 artillery divisions, and a substantial number of separate artillery, anti-aircraft artillery, antitank, and rocket artillery brigades and regiments.

^b Estimated disposition of Soviet line divisions: northwestern USSR, 9; western USSR, 49; southwestern USSR, 13; southern USSR, 21; central USSR, 10; Soviet Far East, 19; Eastern Europe, 26 (East Germany, 20; Poland, 2; Hungary, 4).

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Table 4

ESTIMATED STRENGTH OF EUROPEAN SATELLITE AND ASIAN COMMUNIST GROUND FORCES
IN LINE DIVISIONS, 1 JULY 1961

COUNTRY	RIFLE DIVISIONS			MOTORIZED RIFLE/ MECHANIZED DIVISIONS			TANK DIVISIONS			AIRBORNE DIVISIONS			TOTAL
	No.	TO/E	Actual	No.	TO/E	Actual	No.	TO/E	Actual	No.	TO/E	Actual	
E S A T E L L I T E S													
Bulgaria.....	6	11,500	5,500	...	...	...	1	10,500	6,000	...	...	...	7
Czechoslovakia..	...	...	...	12	13,000	6,000	2	10,500	5,000	...	...	...	14
East Germany...	...	...	...	4	12,000	7,000	2	9,000	6,000	...	...	...	6
Hungary.....	...	...	...	5	13,000	7,000	...	...	...	...	...	...	5
Poland.....	...	...	...	9	13,000	8,500	4	10,500	7,000	1	Unk	5,000	14
Rumania.....	11	11,500	8,000	1	14,000	8,500	1	10,500	7,000	...	...	...	13
Total.....	17			31			10			1			59
COMMUNIST ASIA													
Communist													
China.....	112	17,600	15,000	...	...	...	3	7,800	6,600	3	8,300	7,000	^b 118
North Korea....	18	9,187	9,200	...	...	...	1	4,727	4,700	...	...	...	19
North Vietnam..	14	12,500	10,000	...	...	...	...	...	...	...	...	...	14
TOTALS.....	144						4			3			151

* It is estimated that 70 of the Chinese Communist rifle divisions have an actual strength of 15,000 and that actual strength of the remaining 42 divisions is about 14,000.

^b In addition, Chinese Communist forces include three small cavalry divisions.

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Table 5
ESTIMATED BLOC AIR STRENGTH, MID-1961 THROUGH MID-1966

	Mid-1961			Mid-1962	Mid-1963	Mid-1964			Mid-1965	Mid-1966		
	USSR	Euro- pean Satel- lites	Asiatic Com- munists	USSR	USSR	USSR	Euro- pean Satel- lites	Asiatic Com- munists	USSR	USSR	Euro- pean Satel- lites	Asiatic Com- munists
Fighter												
Jet.....	6,550	2,200	2,175	6,100	5,600	4,900	2,300	2,450	4,200	3,600	1,950	2,150
Attack												
Jet (Ftr).....		135	225									
Light Bomber/Reconnaissance * b												
Jet.....	825	160	470	700	500	500	100	275	500	500	50	100
Prop.....		60	180									
Medium Bomber/Tanker *												
Jet.....	1,400			1,350	1,300	1,250		d	1,200	1,150		d
Prop.....			20									
Heavy Bomber/Tanker												
Jet.....	100			100	100	95			90	80		
Turboprop.....	50			50	45	45			40	40		
Transport												
Jet (Med).....	2			5	10	20			20	20		
Prop (Lt).....	1,335	150	200	1,370	1,350	1,040	180	225	900	750	185	250
Prop (Med).....	170			140	120	100			70	50		
Turboprop (Med).....	265	3	2	390	635	780	15	10	925	1,070	50	25
Turboprop (Hvy).....									5	10		
Helicopter *												
Light.....	460	35	55	600	750	900	65	85	1,000	1,150	85	100
Medium.....	75			100	150	200			250	300		
Scaplane												
Prop.....	70		10	50	30			15				35
Turboprop.....				20	50	90			120			
Trainer												
Jet (Ftr).....	425	210	150	400	350	325	225	165	275	250	200	100
TOTALS (Rounded).....	11,750	3,000	3,500	11,350	11,000	10,250	2,900	3,200	9,600	9,100	2,500	2,800

See footnotes on following page

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Footnotes for Table 5.

^a The light bomber figures include reconnaissance aircraft, numbering nearly 300 in Soviet units and 40 in Satellite units in 1961. We believe that an increasing proportion of light bombers, at least in Soviet service, will be used in a reconnaissance role. The Satellite figures include also 60 piston-propelled attack aircraft, and the Asian figures 40 such aircraft, in 1961.

^b We believe that during the next few years the Soviets will probably begin producing and entering into operation a new tactical support light/fighter bomber and reconnaissance aircraft, and the estimates for later years include it in the light bomber category.

^c A number of the medium bomber aircraft are assigned to reconnaissance activities, about 75 Long Range and Naval aircraft at the present time. We believe that an increasing proportion of the medium bomber aircraft force will be used for reconnaissance during the period of this estimate.

^d Depending on developments in political relations between the USSR and Communist China, the Soviets may provide some jet medium bombers, or the technical knowledge necessary for the Chinese Communists to build medium bombers, during the period of this estimate.

^e Helicopter numbers represent our estimate of light and medium helicopters in all military components. In addition to the types listed in this table, it is estimated that the USSR has considerably more than 1,000 small helicopters in service. Because of their varied uses—reconnaissance, antisubmarine warfare, and general utility purposes—these probably will enter service in substantially larger numbers during the period of this estimate. The USSR has also developed heavy helicopters some of which may now be assigned to military units.

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Table 6

ESTIMATED SOVIET AIRCRAFT STRENGTH BY ROLE WITHIN MAJOR COMPONENTS, 1 JULY 1961

	LONG RANGE AVIATION	FIGHTER AVIATION OF AIR DEFENSE	TACTICAL AVIATION	NAVAL AVIATION	MILITARY TRANSPORT AVIATION	TOTAL
Fighter						
Jet.....	.....	4,350	2,150	.....	.....	6,500
Light Bomber						
Jet.....	.....	.....	500	35	.....	535
Medium Bomber/Tanker						
Jet.....	950	.....	75	310	.....	1,335
Heavy Bomber/Tanker						
Jet.....	100	.....	.....	.....	.....	100
Turboprop.....	05	.....	.....	.....	.....	50
Transport						
Jet (Med).....	.....	.....	.....	.....	2	2
Prop (Lt).....	* (220)	* (325)	* (400)	120	1,220	1,335
Prop (Med).....	* (75)	.....	.....	.....	170	170
Turboprop (Med).....	.....	.....	.....	.....	265	265
Helicopter						
Light.....	.....	.....	90	90	^b 280	^b 460
Medium.....	.....	.....	.....	.....	^b 75	^b 75
Reconnaissance						
Jet (Ftr).....	.....	.....	50	.....	.....	50
Jet (Lt Bmr).....	.....	.....	300	.....	.....	300
Jet (Med Bmr).....	30	.....	.....	40	.....	70
Prop (Seaplane).....	.....	.....	.....	70	.....	70
Trainer						
Jet (Ftr).....	.....	275	150	.....	.....	425
TOTALS (Rounded)	1,150	4,625	3,300	650	2,000	11,750

* The transport figures in parentheses are not included in the totals of the component under which they are listed; they are, however, included in the Military Transport Aviation figures.

^b See footnote * to Table 5.

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Table 7
GEOGRAPHIC DISTRIBUTION OF SOVIET AIR STRENGTH BY ROLE
1 JULY 1961

AIRCRAFT ROLE	EASTERN EUROPE ^a		NORTH-WESTERN USSR ^b		WESTERN USSR ^c		WEST CENTRAL USSR ^d		CAUCASUS USSR ^e		EAST CENTRAL USSR ^f		FAR EAST USSR ^g		TOTAL	
	Regts	Acft	Regts	Acft	Regts	Acft	Regts	Acft	Regts	Acft	Regts	Acft	Regts	Acft	Regts	Acft
Fighter	28	900	19	575	47	1,400	37	1,115	34	1,015	21	645	28	850	214	6,500
Jet.....																
Light Bomber.....	5	175	4	100	9	225	....	....	1	25	....	....	....	....	16	525
Jet.....																
Jet Medium Bomber/Tanker.....			6	120	27	760	7	200	1	25	....	15	11	215	51	1,335
Jet Heavy Bomber/Tanker.....			....	....	1	15	2	30	....	....	....	....	3	55	6	100
Turboprop Heavy Bomber.....			....	....	2	30	....	....	....	....	2	20	....	....	4	50
Transports																
Jet (Med).....			....	....	....	....	....	2	....	....	....	....	....	....	....	2
Turboprop (Med).....			....	....	35	....	....	190	....	....	....	....	....	40	....	265
Prop (Lt).....	130		....	135	280	....	....	290	....	130	....	75	....	295	....	1,335
Prop (Med).....			....	5	130	....	....	10	....	2	....	2	....	20	....	170
Helicopter																
Light.....		80	....	15	....	210	....	65	....	10	....	20	....	60	....	460
Medium.....			....	....	....	10	....	45	....	10	....	10	....	....	....	75
Reconnaissance																
Jet (Ftr).....		50	....	....	....	....	....	....	....	....	....	....	....	....	....	50
Jet (Lt Bmr).....		80	....	20	....	80	....	20	....	20	....	20	....	55	....	300
Jet (Med Bmr).....			....	20	....	....	....	....	....	....	....	....	....	50	....	70
Prop (ASW).....			....	20	....	20	....	....	....	....	....	....	....	30	....	70
Trainer																
Jet (Ftr).....		55	....	40	....	95	....	70	....	70	....	40	....	55	....	425
TOTALS (Rounded)		1,475		1,050		3,300		2,050		1,300		850		1,725		11,750

Military Districts

^a East Germany, Hungary, and Poland.^b Leningrad MD.^c Baltic, Belorussian, Carpathian, Kiev, and Odessa MDs.^d Moscow, Volga, and Ural MDs.^e North Caucasus and Transcaucasus MDs.^f Turkestan and Siberian MDs.^g Far East and Transbaikai MDs.

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Table 8

ESTIMATED PERFORMANCE OF SOVIET INTERCEPTOR AIRCRAFT *

	FAGOT	FRESCO A and B	FRESCO C	FRESCO D	FARMER A	FARMER E	FLASHLIGHT A	FISHBED C	FITTER B and FISH-POT B
Soviet Designation	MIG-15	MIG-17	MIG-17	MIG-17	MIG-19	MIG-19	YAK-25	MIG-21	1959-1960
Year Into Service	1950	1953	1954	1955	1955	1959	1955	1960	
Maximum Speed:									
Sea Level.....	585	570	570	570	655	650	610	730	660
35,000 ft.....	530	550	560	560	725	745	540	1,000	1,000
40,000 ft.....	525	545	555	555	705	725	535	975	975
Combat Ceiling ^b	51,000	52,400	54,500	54,500	^b 55,800	^b 55,400	49,400	^b 51,200	^b 52,600
Time to Climb to 40,000 ft. (min) ^c	7.0	8.3	8.0	8.0	6.1	5.5	7.9	8.7	7.8
With Afterburner.....			6.6	6.6	3.7	3.3	.....	3.1	3.0-3.2
Combat Radius (nm): ^d									
Optimum Mission.....	330	300	270	270	420	365	500	290	465
Optimum/External Fuel.....	575	540	510	510	455	660	575	380	700
Radar:									
Type.....			Range Only	Search/Track	Range Only	Search/Track	Search/Track	Range Only	Search/Track
Range (nm).....			2.0	5/3	2.0	8/6	12.6/8.3	3.0	10/7
Armament:									
Guns.....	2 x 23 mm 1 x 37 mm	2 x 23 mm 1 x 37 mm and 16 x 55 mm	2 x 23 mm 1 x 37 mm and 32 x 55 mm	3 x 23 mm and 32 x 55 mm	2 x 23 mm or 32 x 55 mm	<i>none</i>	2 x 37 mm and 95 x 55 mm	3 x 23 mm and 38 x 55 mm	2 or 4 x 30 mm and 76 x 55 mm
Rockets ^e		2 x 220 mm or 3 x 325 mm	4 x 220 mm or 4 x 325 mm	4 x 220 mm or 4 x 325 mm	4 x 220 mm or 4 x 325 mm		5 x 220 mm or 5 x 325 mm	2 x 220 mm or 2 x 325 mm	4 x 220 mm or 4 x 325 mm
Guided Missiles ^f		2 AAM	4 AAM	4 AAM	4 AAM	4 AAM	5 AAM	2 AAM	4 AAM

* NOTE: This Table does not include data on certain new fighter types not yet in operational service, and for which only preliminary estimates of performance characteristics are available.

^b Combat ceiling is the maximum altitude at which the rate of climb is 500 feet per minute with maximum power and at combat weight. All of the newer supersonic fighters can attain significantly higher altitudes—possibly up to 70,000 feet—using zoom techniques. However, operational capabilities would be progressively reduced above combat ceiling.

^c Time to climb is calculated on the basis of gross take-off weight with internal fuel only.

^d In calculating optimum mission, fuel reserves are reduced to permit extended range. Optimum mission with external fuel assumes two wing tanks except in the case of FLASHLIGHT A which carries one belly tank.

^e These are considered to be maximum loads with internal fuel only, and do not exclude the possibility of other combinations of rocket and missile armament. ^f FRESCO "E" has performance characteristics similar to those of FRESCO "A" and "B," but is equipped with airborne intercept radar of the FRESCO "D" type.

* FARMER "B," "C," and "D" versions are also in operational use. FARMER "C" and "D" have range only radar. FARMER "B" has search and track radar with search/track capabilities similar to those of the FARMER "E" radar.

^h As the result of evidence acquired during the past year, our estimates of combat ceiling have been lowered by about 5,000 feet in the case of FARMER, and by about 10,000 feet for FISHBED, FITTER, and FISHPOT.

Table 9

ESTIMATED SOVIET LONG RANGE AIRCRAFT PERFORMANCE UNDER AN OPTIMUM MISSION PROFILE

(Calculated in accordance with US MIL-C-5011A Spec except that fuel reserves are reduced to permit a maximum of 30 minutes loiter at Sea Level, and aircraft operate at altitudes permitting maximum radius/range)

	BADGER	BISON	BEAR	BLINDER *
<u>Combat Radius/Range (nm) *</u>				
a. 25,000 lb. bombload.....	...	2,700/5,100	4,150/7,800	...
one refuel ^b.....	...	3,650/6,900	...	...
b. 10,000 lb. bombload.....	1,800/3,450	2,900/5,700	4,500/8,800	1,650/3,300
one refuel ^b	2,500/4,750	3,800/7,500	...	^c 2,200/4,400
c. 3,300 lb. bombload.....	2,000/3,900	3,000/6,000	4,700/9,300	1,850/3,700
one refuel ^b	2,650/5,200	3,900/7,800	...	^c 2,500/5,000
<u>Speed Altitude (kts./ft.)</u>				
a. Maximum Speed at Optimum Altitude (kts./ft.) ^e	555/14,200	535/18,800	500/25,000	1,035/36,000
b. Target Speed/Target Altitude (kts./ft.) ^e	475/42,300	460/42,700	435/41,600	860/44,000
Combat Ceiling (ft.) ^e	46,700	45,900	40,300	55,000
<u>Terminal Target Altitude (ft.) ^d</u>				
a. 25,000 lb. bombload.....	...	53,900	47,200	...
b. 10,000 lb. bombload.....	52,500	55,400	48,000	59,300
c. 3,300 lb. bombload.....	54,300	56,100	48,700	60,000

* The range and radius figures given in this table are maximum figures. They are applicable to the most up-to-date models of these aircraft, flying optimum mission profiles on direct routes. The use of older model aircraft, standard mission profiles, indirect routes, low-level penetrations or other tactics designed to delay or evade detection and interception would reduce the effective range. The calculation of degradation in range and radius resulting from sophisticated penetration tactics is a complex process which can best be accomplished for individual missions.

As a rule-of-thumb measure however, for *low-level operations* by heavy bombers, the radius at optimum altitude will be decreased about 1.6 to 2 miles for every mile flown at sea level.

For missions with *air-to-surface* missiles carried externally, rule-of-thumb figures for combat radius are given in Table 3 of this Annex.

^b Refueling estimates based upon use of compatible tankers which provide approximately 35 percent increase in radius/range.

^c For 10,000 lb. bombload.

^d Service ceiling at maximum power with one hour fuel reserves plus bombload aboard. No range figure is associated with this altitude.

^e Jet medium bomber with supersonic "dash" capability of about Mach 1.5. Estimates of range and radius assume a "dash" of 200 n.m. at this speed.

^f We have no evidence regarding refueling for the BLINDER.

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Table 10
ESTIMATED PERFORMANCE OF SOVIET TRANSPORT AIRCRAFT.
(Calculated in accordance with US Mil C-5011A)

AIRCRAFT	OPERATIONAL DATE	SOVIET DESIGNATION	POWER PLANT		TROOPS	PASSENGERS	POUNDS	COMBAT RADIUS/RANGE (NM)	SPEED/OPERATIONAL ALTITUDE ^b (KTS./FT.)	CRUISE SPEED ALTITUDE ^c (KTS./FT.)	SERVICE CEILING
			Number	Type							
CAB ^d	1939	Li-2	2	Piston	25	19	3,300	535/1,175	165/5,000	130/13,000	16,600
COACH	1947	Il-12	2	Piston	21	18	5,000	665/1,335	220/10,000	165/10,000	26,600
CRATE ^e	1954	Il-14	2	Piston	21	18	4,600	720/1,600	230/10,000	140/10,000	24,000
CAMEL ^f	1957	Tu-104A	2	Turbojet	110	70	18,740	1,100/2,300	530/SL	450/37,000	45,000
BULL TYPE ^g	1954	.....	4	Piston	42	..	26,000	1,670/3,150	300/20,000	235/10,000	39,500
CAMP	1959	An-8	2	Turboprop	75	..	17,000	735/1,450	280/17,000	230/20,000	36,600
CAT	1959	An-10	4	Turboprop	100	84	27,700	665/1,250	400/28,000	300/25,000	42,600
CUB ^h	1959	An-12	4	Turboprop	91	..	22,000	670/1,300	370/25,000	300/25,000	39,400
COOT	1959	Il-18	4	Turboprop	110	75	25,400	1,540/2,890	405/25,000	340/25,000	39,700
CLEAT	1959	Tu-114	4	Turboprop	248	120	29,000	2,690/5,360	485/25,000	390/30,000	41,000
COKE	1961	An-24	2	Turboprop	50	32 (max)	8,660	530/1,000	380/-	240/25-32,000	32,000
COOKPOT	1961	Tu-124	2	Turbofan	54	40 (max)	10,000	.../1,000	540/-	485/32,500	.....

^a In addition to the aircraft listed on this table, we continue to estimate that the Soviets could, within the period of this estimate, bring into service a heavy turbojet transport comparable to the Boeing 707.

^b Normal rated power.

^c Constant altitude mission.

^d Soviet version of DC-3.

^e Several improved modifications of this aircraft have been developed although performance has remained approximately the same. The load and passenger-carrying capability has increased substantially.

^f The original CAMEL (Tu-104), a transport design based on the BADGER (Tu-16), has payload and performance characteristics somewhat inferior to those of the TU-104A noted above. The latest modification of this aircraft, the Tu-104B, has about the same characteristics as the Tu-104A, but can carry a larger payload.

^g BULL (Tu-4), an obsolete medium bomber of the B-29 type, modified for use as a transport.

^h CUB is a military version of CAT (An-10) with rear loading doors.

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Table 11
ESTIMATED PERFORMANCE OF SOVIET HELICOPTERS

AIRCRAFT	HEN	HOG	HARE	HOUND	HORSE	HOOK
Operational Date.....	1958	1958	1951	1953	1958	1960
Soviet Designation.....	Ka-15	Ka-18	Mi-1	Mi-4	Yak-24	Mi-6
Power Plant.....	AI-14V	AI-14V	AI-26V	ASh-82V	ASh-82V	TV-2VM
Number.....	1	1	1	1	2	2
Type.....	Piston	Piston	Piston	Piston	Piston	Turbine
Radius/Range (nm).....	105/230	120/240	85/210	120/240	65/135	200/400
Payload						
Troops.....	1	3	2	16	40	70
Cargo (lbs).....	200	550	355	3,200	8,800	20,000
Maximum Speed (kts. at Sea Level).....	85	85	100	145	150	140
Cruise Speed/Altitude (kts./ft.).....	65/5,000	65/5,000	75/5,000	100/5,000	125/5,000	110/5,000
Service Ceiling (ft.).....	11,500	11,500	16,400	19,000	13,500	12,500

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Table 13

ESTIMATED BLOC SUBMARINE STRENGTHS, 1961-1966

FLEET AREA	MID-1961														Mid-1965	Mid-1964			Mid-1963	Mid-1962			Mid-1966																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	NORTH-ERN	BAL TIC		BLACK SEA		MEDITERRANEAN		PACIFIC		TOTAL ALL FLEETS			Mid-1962	USSR		USSR	USSR	USSR		USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR	USSR

* First line units are those of modern construction. The second line category lists units over 14 years old which, by virtue of age and design, are considered useful only for training or perhaps coastal defense. Some of the second line ships will probably be retired from service earlier than on an age criterion, and it is likely that some first line ships will be transferred to other Bloc or non-Bloc countries. Except for account of a pending transfer of four "W" class submarines to Indonesia, this table does not provide for such retirements or transfers.

^b The "W" class, though with a maximum surface cruising range less than half that of the "Z" and "P" class, still meets the arbitrary criterion for classification as a "long range" submarine, i.e., maximum surface cruising range in excess of 8,000 n.m. at 2 kt. per hour. (See Table 14.) The "R" class submarine is evaluated as a converted "W" class; five of these units have been identified in the Northern Fleet, and six more are believed to be in the Black Sea Fleet.

^c Construction difficulties evidently resulting from the withdrawal of Soviet technical assistance have seriously delayed the completion and fitting out of eight additional "W-class" submarines.

^d In addition to the "H" class, one or more other classes of nuclear-powered submarines are believed to be under construction.

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Table 14
ESTIMATED CHARACTERISTICS AND PERFORMANCE OF SOVIET POSTWAR SUBMARINES *

CLASS	LENGTH/ BEAM (Ft.)	DISPLACE- MENT (TONS) SURFACED/ SUBMERGED	DIVING LIMIT (Ft.)	ARMA- MENT ^b TORP/ MINE	PERFORMANCE: SPEED (Kts.)/ENDURANCE (NM)		WAR OF RADIU/ DAYS ON STATION ^c
					Surfaced	Submerged	
"F"	296/27	1,950/2,400	750	26/44	Maximum..... Cruising.....	9.5/9,500 7.0/11,500	17.5/17.5 2.5/125 ^f
"G" ^d	320/28	2,350/2,800	750	26/44	Maximum..... Cruising.....	17.6/6,450 8.3/22,700	6,000/1 6,680/10
"Z" ^e	296/27	1,950/2,400	650	26/44	Maximum..... Cruising.....	18.4/5,050 7.0/11,500	6,300/1 6,000/10
"W"	249/20	1,030/1,320	650	12/16	Maximum..... Cruising.....	8.5/19,500 18.5/2,750	3,100/1 2,800/10
"R" (Improved "W")	249/20	1,030/1,320	650	12/16	Maximum..... Cruising.....	18.5/2,750 9.4/3,950	3,100/1 2,800/10
"Q" ^g	185/18	420/510	450	8/12	Maximum..... Cruising.....	10.0/8,500 7.0/1,875 7.0/1,800 7.0/1,800	870/1 165 ^h 535 ⁱ

* No data are available on characteristics and performance of Soviet nuclear-powered submarines. Performance characteristics of the newly identified "H" class, believed to be nuclear-propelled, are similar to those of early US nuclear-powered submarines. This class is probably armed with ballistic missiles of the type carried in the "Q" and "Z-Conversion" classes.

^b The figures given are for full loads with either torpedoes or mines.

^c These radii are based upon the following arbitrary patrol conditions; each day of transit consists of 12 hours of surface running at cruising speeds during hours of twilight and darkness and 12 hours of snorkel running during the day at snorkel speed.

^d The "G" class is known to be diesel-propelled. Equipped with 3 vertical tubes in its huge sail, it is believed to be armed with 3 ballistic missiles of 150 or 350 n.m. range.

^e About 6 "Z" class submarines have been modified (by enlarging the sail) to carry and launch two ballistic missiles each. In other respects their performance and characteristics are believed to be about the same as the standard "Z" class.

^f These submerged endurance figures are based on estimated performance with lead-acid batteries. However, there is evidence of the possible use in some Soviet submarines of silver zinc batteries, which would appreciably improve performance at low discharge rates. In the case of the "G," "F," and "Z" classes, endurance at 2.5 kts. would be increased to about 450 n.m.; in the case of "W" and "R" class submarines, endurance at 2.0 kts. would be increased to about 360 n.m.

^g It is currently estimated the "Q" class has a single diesel engine designed for both open-cycle and closed-cycle operation. Liquid oxygen (LOX) is believed used as the oxidizing agent for closed-cycle operation. The Soviets have had persisting difficulties with the "Q" class propulsion system. Performance and speed characteristics and operational radii reflect the closed-cycle capability.

^h Assuming an initial spurt on both electric and diesel power at 21.5 kts. for one hour, followed by maximum speed on closed-cycle diesel (16 kts.) for nine hours.

ⁱ Assuming movement at 9.0 kts. on closed-cycle diesel followed by movement at 2.5 kts. on electric power.

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Table 15
ESTIMATED SINO-SOVIET BLOC MERCHANT FLEET STRENGTH, 1961-1966

MID-1961									
FREIGHTER		COMBINATION		PASSENGER		TANKER		TOTAL	
No.	DWT (cc) *	No.	DWT (cc)	No.	DWT (cc)	No.	DWT (cc)	No.	DWT (cc)
USSR.....	710	27	91,600	55	155,300	127	1,057,900	919	4,154,900
Satellites.....	176	6	44,900	7	16,400	14	157,400	203	1,159,100
Communist China and North Korea....	131	10	16,800	9	18,300	12	37,000	162	504,800
TOTALS.....	1,017	43	153,300	71	190,000	153	1,249,300	1,284	5,818,800
MID-1966									
FREIGHTER		COMBINATION		PASSENGER		TANKER		TOTAL	
No.	DWT (cc)	No.	DWT (cc)	No.	DWT (cc)	No.	DWT (cc)	No.	DWT (cc)
USSR.....	985	27	92,000	69	223,500	182	1,832,700	1,263	6,420,000
Satellites.....	285	10	75,000	10	19,000	27	311,000	332	1,933,000
Communist China and North Korea....	205	15	33,600	15	30,000	20	88,000	255	1,171,600
TOTALS.....	1,475	52	200,600	94	272,500	229	2,231,700	1,850	9,524,600

* Deadweight Tonnage cargo capacity—DWT (cc)—is the total weight of cargo which a vessel can carry in full load condition. DWT (cc) is equal to deadweight tonnage (DWT) minus the full load allowance weight of crew, passengers, provisions, fuel, water, and other items necessary for use on a voyage.

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